

Recycled Water Use Project Plan

Prepared for
Los Angeles Unified School District



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Table of Abbreviations

Abbreviation	Definition
AB1881	Assembly Bill 1881
ACP	Asbestos Cement Pipe
APN	Assessor's Parcel Number
BMP	Best Management Practice
BP	Backflow Prevention
CAD	Computer Aided Drafting
CD	Compact Disc
CDPH	California Department of Public Health
DI	Ductile Iron
DVD	Digital Video Disc
FT	Feet
FTP	File Transfer Protocol
GPM	Gallons Per Minute
IN	Inches
LACDPH	Los Angeles County Department of Public Health
LADWP	Los Angeles Department of Water and Power
LARWQCB	Los Angeles Regional Water Quality Control Board
LAUSD	Los Angeles Unified School District
OEHS	Office of Environmental Health and Safety
PDF	Portable Document Format
PE	Professional Engineer
PG	Professional Geologist
POC	Point of Connection
PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
REA	Registered Environmental Assessor
RPPD	Reduced Pressure Principle Device
RSGV	Resilient Seated Gate Valve
RW	Recycled Water
SQ	Square
TDS	Total Dissolved Solids
TIFF	Tagged Image File Format
UPC	Uniform Plumbing Code
USC	University of Southern California

Revision History

V1.00 – April 21, 2011 – Original Document

V1.01 – August 25, 2011 – Updated Standard Technical Drawings

V1.02 – December 6, 2011 – Updated Standard Technical Drawings

1.0 Introduction

1.1 Background

The Los Angeles Unified School District (LAUSD) encourages the use of recycled water for landscape watering and other beneficial uses at selected schools. By implementing beneficial uses of recycled water, LAUSD can substantially reduce potable water usage, thereby conserving scarce resources and reducing water costs. LAUSD intends to install recycled water systems at selected new schools and retrofit existing potable water systems to accommodate recycled water at selected existing schools.

To support this effort, LAUSD retained VCA Engineers and AECOM to establish guidelines for the proper planning, design, construction and maintenance of cost-efficient recycled water improvements for both new and retrofit applications. This "Recycled Water Use Project Plan" can be used by planners, engineers and contractors to properly plan, design, construct and maintain a recycled water system that is consistent with the recycled water guidelines published by the Los Angeles County Department of Public Health (LACDPH) and the State of California Department of Public Health (CDPH). These guidelines should be included as part of the supplied documents to design Architects and contractors before the planning process of school sites begins.

It should be noted that these guidelines do not replace the minimum necessary on-site controls that are contained in "Guidelines for Use of Reclaimed Water", issued by the CDPH; in the County Public Health Code; and in Title 22 of the California Administrative Code. In addition, implementation of Best Management Practices (BMPs) is necessary to minimize over spray, ponding, soil erosion and to ensure efficient irrigation practices as well as public health and safety. BMP Guidelines are located in Section 27.0 of this document.

1.2 Using the Project Plan

This Project Plan is intended to provide the guidelines and information necessary to develop a recycled water project from the planning phase through to maintaining a site's recycled water system. This document shall be used by LAUSD staff, design Architects and Engineers, contractors during construction and by the LAUSD site maintenance staff. Checklists have been provided throughout the document at key phases of development of the recycled water system to assist personnel in the tracking and documentation of information.

The process of developing recycled water systems begins with the Planning Phase. The Planning Phase involves prioritizing potential recycled water connections; entering a new record for each site into a tracking database, which tracks the status of the recycled water progress; referring to the LAUSD planting list with salinity and boron tolerance; and conducting public outreach and education of recycled water.

The next phase is the Pre-Design Phase. The Pre-Design Phase contains important steps that prepare the necessary information for the Design Phase. The Pre-Design Phase involves coordination with the site representative to introduce the concept of retrofitting a site for recycled water use, conducting site visits, utility research and soil sample collection and analysis.

The Design Phase of a recycled water project involves the preparation of construction plans and specifications in accordance with all applicable system standards and design standards. In order to aid engineers, design Architects and landscape designers to create construction documents in a uniform format, standards and guidelines for the development of these documents are provided. Also provided are guidelines for submittal of such plans and specifications for final approval by LAUSD and LACDPH prior to construction.

The Construction Phase involves the construction of the site's recycled water system, inspection of the system, appropriate field testing required, the final inspection and connection of the system to the recycled water supply and recording field notes to as-built drawings.

The last phase is the Maintenance Phase. The Maintenance Phase includes the training of maintenance staff to properly use and maintain the recycled water system, using best management practices to significantly reduce runoff and ponding of recycled water, and performing annual site inspections and maintenance procedures. Also included in this phase is proper handling of emergencies and conducting future work on the recycled water system as needed.

Throughout these phases, different entities will have varying responsibilities. It is important that all people involved in the process of developing a recycled water project understand their responsibilities and roles in the project. To assist in this understanding and summarize the roles and responsibilities, refer to Figure 1 on the following page.

1.3 Recycled Water Use within LAUSD Sites

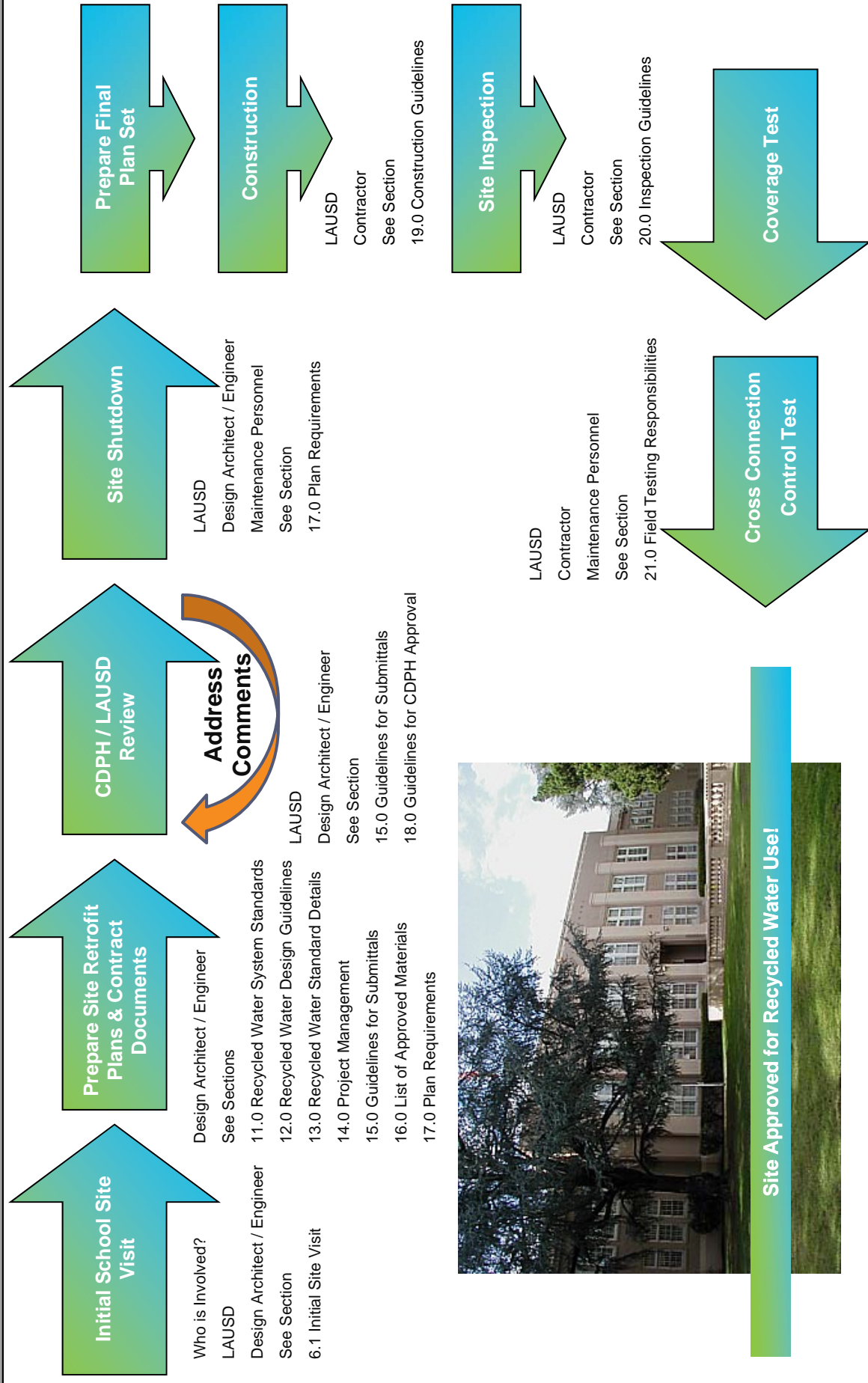
These guidelines are applicable to elementary, middle and high schools, and are limited to the use of recycled water for irrigation and toilet flushing only. A list of factors that need to be considered for determining proper use of recycled water at school sites is included in Section 2.1 and should be considered when prioritizing recycled water connections.

Figure 2 illustrates the site approval process from planning a recycled water retrofit system to final approval and delivery of recycled water at a site. Figure 3 illustrates the process during the design phase to obtain approval of the recycled water retrofit design plans of an existing irrigation system. Since the design of new recycled water irrigation systems would be part of a larger school design project, the process of design plan approval follows the standard LAUSD design approval process for schools. The design of a recycled water irrigation system for a new school site would not have an initial site visit since the school would not exist.

Figure 1 - Roles and Responsibilities

Role	Responsibilities	See Section
LAUSD	Selection and prioritization of LAUSD sites for recycled water projects.	2.0
	The Project Manager for each site shall maintain their site's entry in the Site Tracking Database through to project completion.	3.1
	Send letter for public outreach to appropriate recipients.	5.0
	Customer Coordination - sending an initial contact letter.	6.0
	Permit application fees for utility research.	9.0
	Inspection of construction	20.0
	Cross connection control tests at least every four years.	21.0
	Provide construction documents to maintenance department.	24.0
	Prepare and attend Site Supervisor Training	25.0
	Track staff and site supervisor training.	26.0
Design Architect/Engineer	Public Outreach and Education	5.0
	Assisting LAUSD with customer coordination. Conducting the initial site visit with the site representative.	6.0
	Filling checklists during initial site visit and subsequent site visits.	7.0, 8.0
	Utility Research	9.0
	Soil sampling during design phase for healthy plant growth and verification of safe plants for recycled water irrigation use.	10.0
	Prepare the construction documents and construction estimate.	Design Phase
	Prepare a hydro zone plan per AB1881 for new school sites.	12.7
	Project Management duties	14.0
	Attend the initial site shut down test.	17.0
	Prepare as-builts for LAUSD.	23.0
Contractor	Follow information provided in construction documents	Construction Documents
	Follow the Construction Guidelines	19.0
	Conduct coverage and pressure test in the presence of LAUSD inspection staff.	21.0
	Schedule and attend the cross connection control test.	21.0
	Final Inspection and Acceptance	22.0
	Provide field markings and notes to the design Architect for creation of as-builts.	23.0
	Maintenance of site after project completion and coordination with the LADWP cross connection control program.	Construction Documents
	Conduct the initial shut down test with oversight from LACDPH.	17.0
	Assist with coverage test.	21.0
	Cross connection control tests at least every four years.	21.0
	Cross connection control survey with a certified cross connection control specialist every year the test is not performed.	21.0
	Attend Site Supervisor Training	25.0
	Follow Best Management Practices Guidelines	27.0
	Perform annual inspection with a LADWP representative.	28.0

SITE RETROFIT FLOW CHART

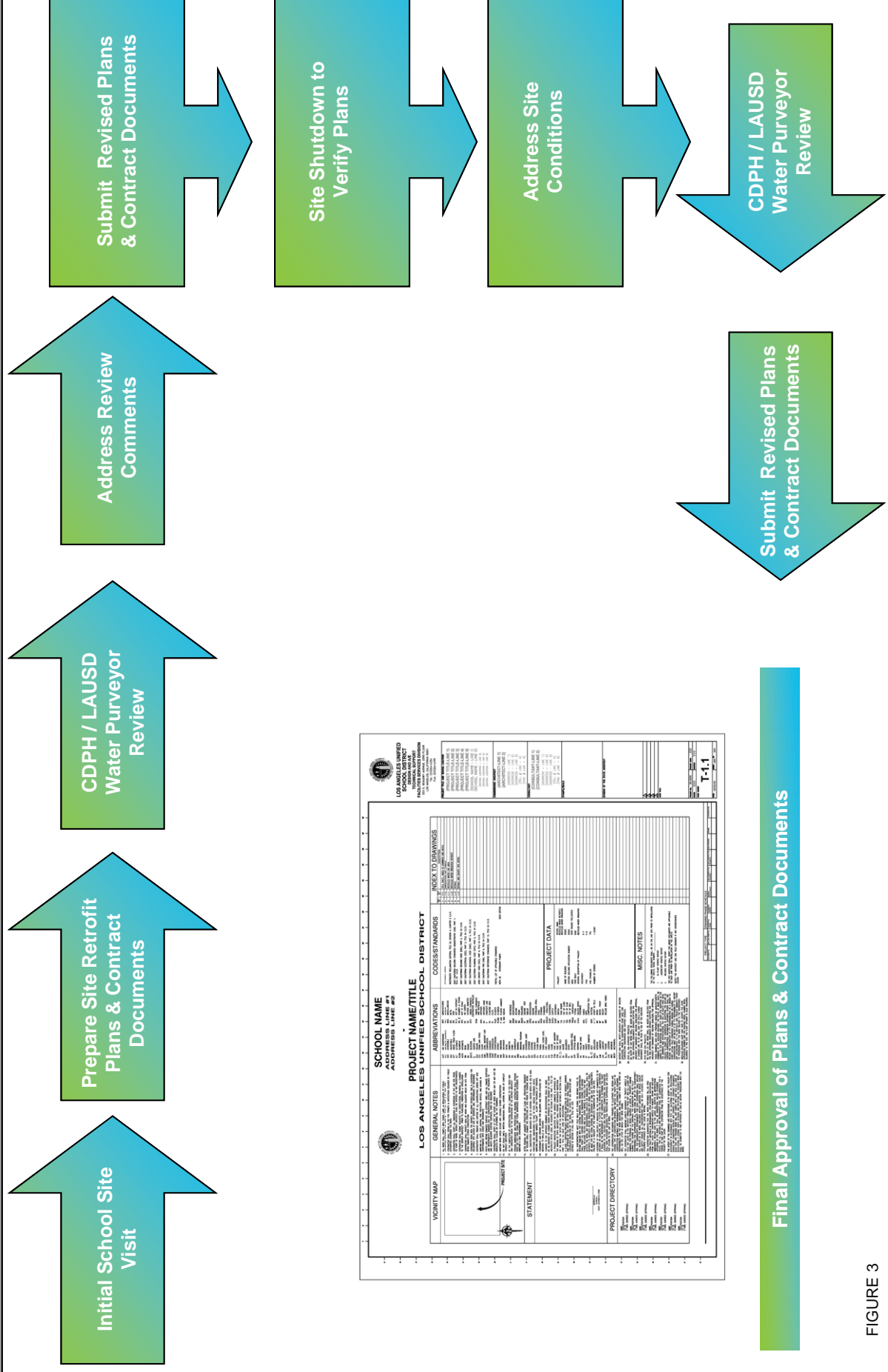


Site Approved for Recycled Water Use!

FIGURE 2

DESIGN APPROVAL PROCESS

See Section 13.0 for Additional Details



Final Approval of Plans & Contract Documents

FIGURE 3

PLANNING PHASE

The planning phase of a recycled water system begins with prioritizing potential recycled water connections to identify the most cost-effective use of recycled water on a school site. This chapter presents ranking criteria to aid in the prioritization of water connections, discusses how to classify each school site by estimating the total benefit per acre-foot of recycled water delivered, discusses how to create and maintain a database to track the status of recycled water implementation at each site, presents the update to the LAUSD planting list for salinity and boron tolerance, and discusses public outreach and education.

2.0 Prioritization of Recycled Water Connections

2.1 Development of Ranking Criteria

The following ranking criteria shall be developed in screening each school site and creating a weighted list of targeted sites. This criterion will include, but not be limited to, the following:

- Total annual demand for irrigation water for each school from irrigation meter records
- Proportional cost of the service lateral from the regional transmission main to the school site.
- Cost of service connection from the lateral and/or transmission main to the existing irrigation meter.
- Estimated cost of onsite conversion work. This will be a planning-level estimate.
- Other factors such as receptiveness to retrofits, right-of-way requirements if easements are required to connect the meters to the laterals, and service life of the customer (plant expansions, planned demand reductions, etc.).

When evaluating school sites for recycled water use, the following items should be taken into consideration:

- In areas that are dedicated to kinder age children, potable water use will be maintained and recycled water use shall not be used in these areas or in the proximity without proper separation of potable water and recycled water systems.
- Areas that use artificial turf may use an irrigation system to cool off the surface of the turf. This area shall remain irrigated with potable water only and shall not be served by recycled water since ponding can occur.

2.2 Preparation of Recommended Order of Work

Using the ranking criteria above, each school site would be assessed, resulting in a total Cost/Acre-foot delivered. Based on expected revenues from recycled water sales, a total Benefit/Acre-foot Delivered will be determined. By comparing the Cost versus the Benefit for each site, all of the schools that rate a Cost/Benefit ratio of 1.0 or higher will be considered viable candidate users and ranked accordingly. Further evaluation will be given to schools that fall below the 1.0 Cost/Benefit ratios.

3.0 Database for Site Tracking

To assist in tracking the status of multiple sites through the recycled water retrofit and new construction process, a tracking database should be developed. Status updates shall be entered frequently as the recycled water retrofit or new construction progresses. The basic framework of the database is included with this document as an MS Access database on CD. The framework of the database includes the following fields and data types. Sample entries are also provided in the following table.

Field Name	Data Type	Sample Entry
ID	AutoNumber	None, Not User Editable
Site_Name	Text, 100 Characters	ABC High School
Site_Address	Text, 100 Characters	1234 Sesame Street, LA, 91405
Site_Supervisor	Text, 50 Characters	Joe Smith
Site_Supervisor_Phone	Text, 20 Characters	213-555-1234
LAUSD_Contact_Name	Text, 50 Characters	Jim Smith
CDPH_Contact_Name	Text, 50 Characters	John Smith
CDPH_Contact_Phone	Text, 20 Characters	213-555-2345
Design_Consultant_Company	Text, 100 Characters	ABC Design Inc
Design_Consultant_Name	Text, 50 Characters	Jack Smith
Design_Consultant_Phone	Text, 20 Characters	213-555-3456
Construction_Contractor_Company	Text, 100 Characters	ABC Construction
Construction_Contractor_Name	Text, 50 Characters	Jerry Smith
Construction_Contractor_Phone	Text, 20 Characters	213-555-4567
RW_Retrofit	Yes/No	Y
RW_New_Construction	Yes/No	N
Potable_Meter1_Size	Number, Double	3
Potable_Meter2_Size	Number, Double	2
Potable_Meter3_Size	Number, Double	2
RW_Meter1_Size	Number, Double	2
RW_Meter2_Size	Number, Double	
RW_Meter3_Size	Number, Double	
Tracking_Start_Date	Date/Time	2/5/2011
Planning_Start_Date	Date/Time	2/5/2011
Pre_Design_Start_Date	Date/Time	3/5/2011
Design_Start_Date	Date/Time	4/5/2011
Initial_Site_Visit_Date	Date/Time	4/8/2011
Site_Shutdown_Date	Date/Time	4/8/2011
DPH Approval of Design Date	Date/Time	4/22/2011
Construction_Start_Date	Date/Time	8/8/2011
Cross_Connection_Control_Test_Date	Date/Time	
Construction_End_Date	Date/Time	
As-Built Date	Date/Time	

Field Name	Data Type	Sample Entry
Comments	Memo	Potable meter #2 will be converted to RW, RW Meter to match 2 inch size. Cross connection test to be performed 9/8/2011.

3.1 Maintaining the Site Tracking Database

Tracking the status of sites through the recycled water retrofit and new construction process shall be performed at the beginning of any work on a new site, and at key milestones during the recycled water design through to final connection. **The LAUSD project manager for the site shall be the person responsible for tracking the status of progress on their site.** Comments shall be entered in the “Comment” field when dates are determined for the next step in the process as well as any comments that clarify the status of the site.

4.0 Recycled Water Planting List

A reference list of plant species approved for use on school sites per the LAUSD School Design Guide 2010 is found in Appendix A. The list was reviewed using an approximated soil analysis for Los Angeles county and average recycled water results. The known tolerance levels to salinity and boron are included in the list. The list is provided for baseline guidance to be utilized in assessing an already established plant portfolio. While the recommended plants will be generally suitable for the average soil and recycled water source at LAUSD sites, plant selection can be improved with soil and recycled water quality analysis at the specific site. See Section 10.0 for a description of soil sampling requirements.

The full text of the study performed to evaluate the LAUSD plant list, as well as the references used in the study, is included in Appendix A.

5.0 Public Outreach and Education

In order to successfully implement a recycled water program at school sites, public outreach and education of school staff, parents and students are required.

At a minimum, the design Architect shall prepare the following:

- A letter inviting staff, parents and students to a public outreach meeting, providing two possible dates. The letter shall be sent by the LAUSD Recycled Water Program Manager.
- Conduct two (2) public outreach meetings, which will include school staff, parents and students.
- Provide a telephone number for questions from the community.

The following information shall be used to develop material for public outreach:

- The state of Los Angeles water supply challenges, which include dependence on imported water, and limited funding for water projects.
- Impacts of climate change, environmental and legal issues on water resources.

- Los Angeles Department of Water and Power (LADWP) Water Supply Action Plan – “Securing LA’s Water Supply” (May 2008)
 - Maximize water recycling
 - Increase recycled water use 600%
 - Water savings
- Proper uses of recycled water
- Public concerns and scrutiny – respond to each known public concern mentioned
- Recycled water quality
- Past success with recycled water projects

PRE-DESIGN PHASE

The pre-design phase of a recycled water system includes customer coordination, site visits, utility research and soil sample collection and analysis. This chapter discusses each of these items and provides checklists for design challenges and site visits.

6.0 Customer Coordination

Assisting LAUSD with customer coordination shall be performed by the design Architect. Customer coordination is required for retrofits and new recycled water systems. The first step involves writing a letter to the school that describes the recycled water program, goals and requirements. The initial contact letter shall also identify specific deliverables and mention who is the proper point of communication regarding the recycled water project. For the design of recycled water use for a new school site, this step is not required.

6.1 Initial Site Visit

Coordination with the school to acquire site as-built drawings for the potable water and irrigations systems, conducting the initial site visit, and ensuring constant communication with the customer are the responsibility of the design Architect. The initial site visit will provide the first opportunity for the designer to become familiar with the as-built drawings, school site and record observations on the checklists provided in Sections 7.0 and 8.0.

7.0 Checklist for Design Challenges

The first checklist on the following page shall be used for recording Design Challenges on each site during the initial site visit. This checklist shall be used in conjunction with the Site Checklist found in Section 8.0.

8.0 Checklist for Site Visits

The second checklist on the following page shall be used for recording information during Site Visits at each location. During the initial site visit, the Checklist for Design Challenges shall also be used.

9.0 Utility Research

Utility research is an important part of the pre-design process and shall be conducted to determine the locations of underground utilities. Utility research is a cost effective strategy which allows utility constraints to be considered during the alignment studies to avoid potential conflicts.

A list of utility agencies in the project area can be obtained through Digalert. Letters shall be sent to utility agencies in the project area requesting utility records.

On site utilities at each school site shall be obtained from record drawings of onsite facilities from LAUSD.



Los Angeles Unified School District
Recycled Water Use Sites

Project Name _____
LAUSD W.O. _____
Date _____

Checklist #1 - Design Challenges

The design Architect uses this checklist to record potential design challenges found at each site during the initial site visit.

Item	Comments
<input type="checkbox"/> Hydraulically operated old irrigation system	
<input type="checkbox"/> Existing streams, rivers, or lakes	
<input type="checkbox"/> Existing storm drains in irrigated areas	
<input type="checkbox"/> As-builts not available	
<input type="checkbox"/> Water pressure vs. recycled water pressure	
<input type="checkbox"/> Dual source	
<input type="checkbox"/> Dual Plumbed	
<input type="checkbox"/> Severe site slopes	
<input type="checkbox"/> Separation issues (landscape areas)	
<input type="checkbox"/> Separation issues (potable / recycled pipelines)	
<input type="checkbox"/> Existing booster pumps	
<input type="checkbox"/> Existing drinking fountains	
<input type="checkbox"/> Existing eating areas	
<input type="checkbox"/> Chemical / Fertilizer injection	
<input type="checkbox"/> Agricultural Areas and Gardens	
<input type="checkbox"/> Kindergarten Area	
<input type="checkbox"/> Artificial Turf	
<input type="checkbox"/> Recycled Water for Toilet Flushing	



Los Angeles Unified School District
Recycled Water Use Sites

Project Name _____
LAUSD W.O. _____
Date _____

Checklist #2 - Site Visits

The design Architect uses this checklist to record information on irrigation devices and site observations. This list should be filled out during the initial site visit and updated at subsequent site visits as necessary.

POC Information

Address			
City, State, Zip			
Contact Name			
Contact Phone No.			
Email			
Total Site Area	_____ acres	Annual Demand	_____ gpm (if available)
Total Irrigated Area	_____ acre-feet	RW Source	_____
Site AIN		Plans Available	_____

Usage Information

Use Type

Irrigation [] _____
Dual Plumbed [] _____
Other [] _____

POC Information

Number of Potable Backflows: _____

Type, Size and Serial Number:

Type, Size and Serial Number:

Type, Size and Serial Number: _____; _____; _____ Location: _____

Number of Fire Services:

Type(s) and Size(s):

Number of Recycled Water Connections:

Backflow Size and Serial Number: _____; _____ Location: _____

Backflow Size and Serial Number: _____; _____ Location: _____

Backflow Size and Serial Number: _____; _____ Location: _____

Public Access: None [], 24 hours [], Limited hours [] _____

Site Supervisor

Name:	
Company:	
Title:	
Phone No. (Office)	
Phone No. (Emergency)	
Email Address:	
Training Completed (Location and Date)	



Los Angeles Unified School District
Recycled Water Use Sites

Project Name _____
LAUSD W.O. _____
Date _____

Checklist #2 - Site Visits

The design Architect uses this checklist to record information on irrigation devices and site observations. This list should be filled out during the initial site visit and updated at subsequent site visits as necessary. Comment as necessary to record the type of items observed.

Item	Observed		Comments
	Yes	No	
Old Irrigation System			
Existing Streams, rivers, or lakes			
Irrigation As Builts Available			
Irrigation Zones			
Dual Source			
Dual Plumbed			
Quick Couplers			
Control Valve Boxes			
Irrigation Controller (type)			
Rain Sensor			
Flow Sensor/Master Valve (size)			
Irrigation Control Valves (type)			
Gate Valves (type)			
Irrigation Heads (type)			
Bubbler Irrigation			
Ex. Irrigation Overspray			
Severe Site Slopes			
Irrigation Runoff			
Irrigation Ponding			
Minimum Separations			
Hose Bibbs			
Booster Pumps (size, hp, V)			
Drinking Fountains			
Play Equipment			
Swimming pools			
Decorative Fountains			
Dining Areas			
Chemical Injection			
Agricultural Areas/Gardens			
Kindergarten Area			
Artificial Turf			

It may be necessary to pothole utilities that are in close proximity or cross the project pipelines to determine actual horizontal and vertical location of such utilities. Care should be taken to not disturb existing utilities. The existing utilities shall remain in operation without interruption.

All utility information in the project area obtained from utility agencies, record drawings and pothole information shall be reflected on the design plans. Existing easements should be identified on any plans submitted to LAUSD. All survey information, ownership, or the right to use or maintain easements should be also indicated in the plans. If any proposed recycled water pipeline is planned to cross or be installed within any existing utility easement, appropriate permits shall be submitted and obtained by the engineer. Any permit application fees will be paid by the Energy Unit of LAUSD.

10.0 Soil Sample Collection and Analysis

Soil sampling and soil management plans shall be performed in accordance with AB1881, Article 10.8 Water Conservation in Landscaping, 65596 (f) for the purpose of promoting healthy plant growth and to prevent excessive erosion and runoff, and the use of mulches in shrub areas, garden beds and landscaped areas as appropriate. The criterion for topsoil is provided in LAUSD Specification Section 02900 Planting. LAUSD specification section 02900 shall be followed and required in the contract documents.

For Office of Environmental Health and Safety (OEHS) purposes, soil sampling is required whenever any earthwork is included in the project. All imported and exported fill materials are required to be tested at site of origin. While a soils engineer provides testing for compaction, grading, etc., the contractor shall retain the services of a licensed environmental professional and an independent State of California certified laboratory to sample and test for the requirements of this section. A request for variance must be submitted in writing to OEHS two weeks in advance of need and be accompanied by a memo explaining the rationale for the variance and a project funding code to cover OEHS review. OEHS specification section 01440 shall be followed and required in the contract documents. Discussion of OEHS requirements is in Section 11.2.

Soil sampling shall be performed to meet the following objectives:

- Ensure that soil is appropriate for healthy plant growth.
- Determine preventive measures and procedures to minimize erosion and runoff.
- Determine appropriate mulches for use with the planned plants used on site. See Section 4.0 for the salinity and boron tolerance of approved plants for use at LAUSD sites.
- Ensure that fill materials imported to school sites are safe for students, staff and visitors.
- Ensure that materials exported from school sites for use at school and non-school sites or offsite disposal/recycling are adequately characterized for lawful disposition.
- Ensure that representative data is collected so that analytical determinations can be made in regard to the previous two objectives.
- Require the contractor to contract with and pay for the services of a licensed environmental professional (licensed State of California Professional Engineer [PE Civil], Professional Geologist [PG] or Registered Environmental Assessor II [REA II]) familiar with environmental site assessment and waste classification and disposal requirements.
- Require the contractor to contract with and pay for an independent, approved California Department of Public Health certified testing laboratory to perform sampling and testing of imported, exported and site generated fill materials.
- Require the contractor to pay all fees required by authorities having jurisdiction over the site area.

- Require the contractor to post bonds required by authorities having jurisdiction over the site area.

DESIGN PHASE

The Design Phase of a recycled water project consists of the preparation of construction plans and specifications in accordance with all applicable system standards and design standards. This chapter summarizes detailed standards, guidelines and ordinances applicable to the preparation of construction plans and specifications for recycled water systems. Also provided are guidelines for submittal of such plans and specifications for approval prior to construction.

11.0 Recycled Water System Standards

The proper design of a recycled water system begins with an understanding of the local, state and federal regulations and standards that should be used throughout the design of a recycled water system. The following list of standards shall be followed, which can be found in the Appendices or using the links as listed. Portions of these references have been included throughout this document in the appropriate sections.

It should be noted that, while this Recycled Water Use Project Plan is comprehensive, regulations and standards are constantly evolving and are subject to change and updates. Recycled water systems shall be designed and constructed according to the latest regulations and standards available.

11.1 Los Angeles Unified School District Standards

Design of recycled water use sites shall conform to the Standards set forth in this Recycled Water Use Project Plan and to conditions set by LAUSD that are in addition to these Standards.

In addition to the Standards set forth in this Recycled Water Use Project Plan, other LAUSD standards that shall also be followed are:

LAUSD Design Guide: <http://www.laschools.org/employee/design/design-guide-intro>

LAUSD Specifications: <http://www.laschools.org/fcs/cc/lausd-bidding/>

LAUSD CAD Standards: <http://www.laschools.org/employee/design/fs-tech-drawings/>

11.2 Other Agency Requirements and References

The following references shall be used, which can be found using the hyperlinks as listed. These requirements are in addition to the LAUSD standards described in Section 11.1.

County of Los Angeles Department of Public Health

The full text of the Guide to Recycled Wastewater Use, Pipeline Construction and Installation can be found at the County of Los Angeles Department of Public Health web site. Relevant information from this reference has been included throughout the Design Phase of this Project Plan and the full text of the Guide shall be entered as an addendum to the general notes of per Section 12.2 item 2).

A Cross Connection Plan Approval Application is required by the County of Los Angeles Department of Public Health. Please note the Recycled Water Plan Checking Fee is \$1,348. The check should be made

to “Los Angeles County Treasurer”. It should be noted that the Plan Checking Fee is as of February 2011 and is subject to change.

A Guide to Recycled Wastewater Use, Pipeline Construction and Installation and the Cross-Connection Plan Approval Application can both be found at:

http://www.lapublichealth.org/eh/progs/envirp/cross_con/cross_con_recycle.htm

Office of Environmental Health Services (OEHS)

OEHS has identified special school use scenarios where area-specific restrictions and/or increased vigilance are recommended if recycled water will be used. These scenarios will require public access controls; application controls, such as shielding of impacted areas (e.g., picnic tables, drinking fountains, etc.) during application; or use restrictions to prevent unwanted exposures to recycled water through inhalation, dermal contact, or incidental ingestion (e.g., water application only during off-use hours). The special school use scenarios include:

- 1) Cooling of artificial turf on playfields, or rubber matting in play areas or under climbing equipment;
- 2) Landscape watering of playfields or similar areas specifically designated for direct use by younger children or special education children (e.g., pre- kindergarten/kindergarten facilities; early childhood education centers; special education facilities; day care facilities at continuation schools);
- 3) Watering of demonstration gardens or community gardens with edible vegetation;
- 4) Landscape watering near grandstands, bleachers, picnic areas, water fountains, where overspray could occur, or where droplets could become aerosolized and possibly inhaled;
- 5) Cooling towers and air conditioning systems with possible exposure of workers or students and staff to aerosols, mists, or spray; such systems may require installation of drift eliminators and use of biocides in treatment waters.

Due to the risks involved with these scenarios, LAUSD requires that recycled water will not be used for any of the following purposes: irrigating artificial turf, irrigation or other use within designated areas for direct use by kinder age children or special education facilities, irrigation of demonstration gardens or edible vegetation, or for cooling tower use. Recycled water may be used for irrigation around eating areas and water fountains, provided there is adequate physical separation and/or physical boundary such that recycled water does not come into direct contact with the surfaces of these facilities.

While the Interim Planting Procedures for Landscapes and Garden Projects does not have any direct impact on the process of providing the design of a recycled water project, a note in the construction documents stating that the Contractor shall follow the planting procedures when planting any vegetation at LAUSD sites shall be provided.

Soil sampling is required whenever any earthwork is included in the project. All imported and exported fill materials are required to be tested at site of origin. While a soils engineer provides testing for compaction, grading, etc., the contractor shall retain the services of a licensed environmental professional and an independent State of California certified laboratory to sample and test for the requirements of this section. A request for variance must be submitted in writing to OEHS two weeks in advance of need and

be accompanied by a memo explaining the rationale for the variance and a project funding code to cover OEHS review. OEHS specification section 01440 shall be followed and required in the contract documents.

The full text of the Assessment and Recommendations for Safe, Healthful Use of Recycled Water at Schools can be accessed from:

http://www.lausd-oehs.org/docs/Misc/RecycledWaterAssessment_2010_0216.pdf

The OEHS Interim Planting Procedures and Imported / Exported Fill Requirements (specification section 01440) can be found at: <http://mo.laschools.org/green-spaces/environmental/>

Los Angeles County Recycled Water Advisory Committee

The Los Angeles County Recycled Water Advisory Committee developed the Recycled Water User Manual in 2005 to convey the general rules, regulations and guidelines regarding the safe introduction and use of recycled water for landscape irrigation in Los Angeles County. Portions of this manual are the same rules, regulations and guidelines mentioned throughout this Project Plan.

The Recycled Water User Manual can be found at:

<http://www.watereuse.org/sections/california/losangeles>

12.0 Recycled Water Design Guidelines

12.1 List of Regulations and Ordinances

Key portions of the Rules and Ordinances that apply to LAUSD recycled water projects are discussed in relevant sections in this report and are referenced to their respective sources.

California Department of Health Services Recycled Water-Related Statutes and Regulations, formerly referred to as “The Purple Book”: <http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Lawbook.aspx>

State Water Resources Control Board Statutes and Regulations:

http://www.waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling/statutes_regulations.shtml

California Code of Regulations, Title 22 (Division 4, Chapter 3) and Title 17 (Division 1, Chapter 5): <http://www.calregs.com/>

System installation must conform to the Uniform Plumbing Code and all other local codes, rules and regulations.

12.2 Information Required on Plans

The following information follows and elaborates on requirements found in the County of Los Angeles Department of Public Health Cross Connection Plan Approval Application. All plans for recycled water use shall include:

- 1) All water meters, recycled water meters and connections to the building, including the reduced pressure principle device (RPPD) with location, size, make, model and serial number on the potable or fire connections. When possible, include the peak flow through the meters (gpm), the static design pressure at the meters (psi), area served through the meter (sq feet or acres), and an estimate of the yearly amount of water served (acre-feet).
- 2) Text from “Guidelines for Pipeline Construction and Installation – For the Safe Use of Recycled / Reclaimed Wastewater” shall be included on the plans as an addendum to the General Notes.
- 3) Plans must indicate the pipe separation requirements.
- 4) All water connections, including but not limited to, quick couplers, valve boxes, controllers, sprinklers, drinking fountains, backflow devices, water closets, etc.
- 5) If no drinking fountains exist in the site, it shall be stated on the plans that no drinking fountains exist. Drinking fountains must be protected from the direct spray of recycled water.
- 6) Internal backflow devices
- 7) All water lines must be uniquely identified on the plans and the corresponding legend. The legend must also show all connections and irrigation appurtenances.
- 8) The legend must list sprinkler information, such as:
 - a) Manufacturer and model number
 - b) Sprinkler radius (feet)
 - c) Operating pressure (psi)
 - d) Flow (gpm)
 - e) Sprinkler pattern
- 9) Connection of potable water in the street to the meter or curb.
- 10) An approved backflow prevention device on the potable service(s), installed as close to the meter(s) as possible.
- 11) An approved backflow prevention device on recycled water service(s), installed as close to the meter(s) as possible, where chemical injection on the onsite recycled water system will be used.
- 12) Signs indicating recycled water use on the site “Do Not Drink” must be shown at all entrances to the site.
- 13) Kinder play areas should be marked as potable water supplied only. No recycled water should be connected to irrigation or other water features in kinder play areas.
- 14) Areas that use artificial turf and have an irrigation system to cool off the turf should be marked as supplied with potable water. No recycled water should be connected to the irrigation system that is used for the artificial turf.

12.3 Design Criteria

Backflow prevention devices are not required on recycled water facilities as long as chemical or fertilizer injection is not used on site. Backflow prevention is required on potable services that also have recycled water services on the same site, in accordance with Los Angeles County Department of Public Health “Guidelines for Pipeline Construction and Installation – For the Safe Use of Recycled / Reclaimed Wastewater”.

The design of recycled water facilities shall conform to the following items:

- The recycled water system shall be completely separate and operate independently from any potable water system. Any cross connections between potable and recycled water systems is prohibited.
- Separate irrigation controllers shall be used for recycled water irrigation systems and for potable water irrigation systems on sites that use both water sources for irrigation.
- Hose bibbs shall be removed from recycled water systems or converted to approved quick coupling valves.

- All stubbed irrigation lines protruding above ground shall be cut and capped below grade.
- Drinking fountains shall be protected from the direct spray of recycled water.
- Overspray and the runoff of recycled water shall be minimized or eliminated.
- Separation between recycled and potable pipelines shall be maintained to the required minimum distances of 10 feet horizontally and 1 foot vertically. Sleeving shall be installed when minimum separation cannot be maintained. For potable and recycled pipelines crossing, the sleeving shall extend a minimum of 10 feet on each side of the crossing for a total minimum length of 20 feet. At no time shall a recycled water pipeline and potable water pipeline be separated by less than 4 feet horizontally.
- Recycled and potable pipelines shall not be installed in the same trench.
- Recycled water shall not be used for any other purpose except for the approved use.
- Looped meters are prohibited.
- The design of the irrigation system shall limit the irrigation period between the hours of 9 p.m. and 6 a.m., or per the direction of the LAUSD.
- Kinder play areas should be supplied with potable water only. No recycled water should be connected to irrigation or other water features in kinder play areas.
- Areas that use artificial turf and have an irrigation system to cool off the turf should be supplied with potable water. No recycled water should be connected to the irrigation system that is used for the artificial turf.
- The application flow rate of recycled water shall not exceed the infiltration rate of the type of soil.
- Minimum cover (depth of finished grade to top of recycled water pipe) shall be 18 inches, for all recycled water irrigation constant pressure pipes. Irrigation laterals with intermittent pressure shall have 12 inches minimum cover.

12.4 Example Recycled Water Retrofit Design

To assist in understanding how these rules and regulations are applied during the design phase, an example of a recycled water retrofit design at Van Nuys High School is included in Appendix B.

Several items should be noted while looking at these example retrofit plans:

- The school utilizes recycled water for irrigation of landscape areas, football field, and all green areas in the school campus.
- Per the design note in Section 15.3.9 of this document, sprinklers, rotor heads and other types of dispersion heads shall have the exposed surface colored purple. Van Nuys High School received an exemption for replacing all sprinklers and valve caps with purple colored caps.
- The project required the Los Angeles Department of Water and Power (LADWP) to ensure the implementation of a high standard retrofit design, a complex, detailed series of shutdown tests including 4 teams comprised of LAUSD, LACDPH and LADWP staff to confirm the location of all vales and system connections due to the absence of some of the record drawings, verification that cross connections did not exist, education of LAUSD staff on the use and maintenance of a recycled water irrigation system and close coordination and work relations with the LACDPH.
- The format of the plans follows standard recycled water retrofit designs for the LADWP and does not follow all the CAD standards found in this document.
- The purpose of this example project is to show the general features that should be included in recycled water retrofit design, and also shows an example of a design that was accepted by the LACDPH.

12.5 Recycled Water for Toilet Flushing

Recycled water use for toilet flushing shall conform to the following requirements found in this subsection which are taken from the California Department of Health Services Recycled Water-Related Statutes and Regulations and per the California Code of Regulations, Title 22.

Prior to indoor use of recycled water, an engineering report shall be prepared pursuant to Section 60323 of Title 22 of the California Code of Regulations that includes plumbing design, cross-connection control, and monitoring requirements for the use site. The report shall be filed with the Los Angeles Regional Water Quality Control Board (LARWQCB) and receive written approval of the report from the CDPH.

This engineering report shall contain the following information:

- A detailed description of the intended use area identifying the following:
 - The number, location, and type of facilities within the use area proposing to use dual plumbed systems,
 - The average number of persons estimated to be served by each facility on a daily basis,
 - The specific boundaries of the proposed use area including a map showing the location of each facility to be served,
 - The person or persons responsible for operation of the dual plumbed system at each facility, and
 - The specific use to be made of the recycled water at each facility.
- Plans and specifications describing the following:
 - Proposed piping system to be used,
 - Pipe locations of both the recycled and potable systems,
 - Type and location of the outlets and plumbing fixtures that will be accessible to the public, and
 - The methods and devices to be used to prevent backflow of recycled water into the public water system.
- The methods to be used by the LADWP to assure that the installation and operation of the dual plumbed system will not result in cross connections between the recycled water piping system and the potable water piping system. This shall include a description of pressure, dye or other test methods to be used to test the system every four years.

A master plan report that covers more than one facility or use site may be submitted provided the report includes the information required in a site specific engineering report. Plans and specifications for individual facilities covered by the report may be submitted at any time prior to the delivery of recycled water to the facility.

Any plumbing modifications to the building shall be done in compliance with state and local plumbing codes.

12.6 Existing Irrigation Systems

For the design and construction of retrofit systems, the standards and guidelines found throughout this Recycled Water Use Project Plan shall be used wherever the actual modifications to the existing system is

necessary. Buried portions of the existing irrigation system that will not be exposed during the retrofit process are exempt from the standards and guidelines.

For example, if the potable system of an existing site is confirmed to be separate from the irrigation system, none of the buried irrigation lines need to be exposed for the sole purpose of marking the lines as recycled water or changing the irrigation pipe to purple pipe. The only modifications required would be to exposed valves, irrigation heads, and would involve installing a backflow on the potable system, if one does not already exist, and installing recycled water use signage and modifications to the irrigation system if there are separation issues between the potable and irrigations system. Marking of the irrigation features is outlined in Section 16.0.

Changes to the landscape per AB-1881 requirements may need to be implemented as part of the retrofit process for existing landscapes and is evaluated on a case-by-case basis.

12.7 New Irrigation Recycled Water Use System

For the design and construction of new irrigation systems using recycled water, the standards and guidelines found throughout this Recycled Water Use Project Plan shall be used. Per District Procedure Clarification No. 153R1, new irrigation systems shall conform to some of the Assembly Bill Number 1881 – Water Conservation in Landscaping Act (AB-1881) requirements:

- 1) Narrow or irregularly shaped shrub areas less than eight (8) feet wide will require low volume popup bubbler irrigation.
 - a) Each shrub shall have one pop-up bubbler, and a small basin to effectively contain water from the bubblers to allow for even distribution of water around each shrub.
 - b) Each tree shall have two deep well bubblers.
- 2) Mulched areas will require low volume pop-up bubbler irrigation.
 - a) Each shrub shall have one popup bubbler.
 - b) Each shall have small basin to effectively contain water from the bubblers to allow for even distribution of water around each shrub.
 - c) Each tree shall have two (2) deep well bubblers.
- 3) No turf areas less than eight (8) feet wide will be allowed.
- 4) All turf areas will require a minimum of 24” offset of permeable paving adjacent to all hardscape.
 - a) Standard overhead irrigation will be required for the turf areas within the permeable paving border.
- 5) Slopes greater than 25% must be irrigated with an irrigation system with a precipitation rate less than 0.75 inches per hour. For larger slopes, overhead irrigation is acceptable.
- 6) No planting will occur within 24” of hardscape, heads will be spaced a minimum of 24” off of hardscape as well. This would include hydro seeded areas.
- 7) No mulch will be allowed for any overhead irrigated areas.
- 8) For smaller slopes and slopes with mulch, low volume bubblers will be required for each plant and each tree will require deep well bubblers as indicated in item 1 & 2 above.
- 9) Recycled water use calculations shall be prepared to reflect the new AB1881 format and ET adjustment factor.
- 10) All valve callouts shall indicate the required information per AB1881.
 - a) Indicate controller station number, valve size, valve flow (GPM), operating pressure of zone, hydro zone number, irrigation method, zone precipitation rate, and zone area square footage.
- 11) Each hydro zone on the irrigation plans will have to be delineated and called out on the irrigation plan per AB1881 requirements. This hydro zone plan will be based on the plant hydro zone plan provided by the design Architect.

- 12) A hydro zone matrix table will have to be provided with all valve information and this table will cross reference the recycled water use calculations.
- 13) LAUSD standards indicate no drip irrigation shall be used, this shall remain in effect.

12.8 AutoCAD Guidelines

The LAUSD CAD Standards serve as a guide to provide consistency in the production of engineering documents, thereby establishing a common language for the design and final construction documentation process.

The LAUSD CAD Standards will assist in the classification for all projects. They will help simplify the transfer of information between design team members. They will also reduce preparation time for translation of electronic data files between design team members giving predictable file translation results.

The LAUSD CAD Standards is a system for organizing and classifying design data, including; a system for naming model files, drawing files, and drawing file layers; a system for organizing the drawing set according to a drawing set hierarchy, drawing sheet layout and format, and schedule layout and format; and plotting guidelines.

The LAUSD anticipates that not all project documents will fully conform in every respect and detail and that most projects will include variations, nevertheless best efforts should be made to meet the standards set here with-in.

The CAD Guidelines for Recycled Water Projects found in Appendix C are to be used for developing recycled water projects in conjunction with the LAUSD CAD Standards and do not supersede them.

13.0 Recycled Water Standard Details

The Standard Details for design of Recycled Water facilities are provided in Appendix D. The standard drawings are applicable to on site recycled water work.

A tracer wire shall be installed for all new recycled water pipeline before the recycled water meter per LAUSD Standard Drawings CVL 028 Trench Section.

14.0 Project Management

Project management during the design and construction of recycled water irrigation shall follow the guidelines in this section, as well as any additional project management tasks as required by LAUSD.

1. Attend a kickoff meeting with LAUSD staff to discuss the scope and parameters of the project as well as LAUSD's experience with the existing facilities. A specific objective of the kickoff meeting shall be to identify an effective strategy to accomplish the project goals. The design Architect will prepare a memorandum to document the established project goals and the project execution strategy. This memorandum will serve as the basis for subsequent action.
2. The design Architect and LAUSD will meet three (3) times after the kickoff meeting (preliminary, intermediate and final) during the design phase. Additional meetings may be

requested by LAUSD depending on project scope. Bi-weekly meetings will also be held at regular intervals during the Construction Contract Administration phase.

3. The design Architect shall prepare a Project Work Plan to set forth the significant milestones and deliverables for the team members to ensure compliance with the established project execution strategy and project goals. Presentation and review of the work plan will be done at the kickoff meeting.
4. The design Architect shall coordinate efforts, monitor schedules and budgets, and administer the contract with LAUSD.
5. The design Architect shall meet with LAUSD personnel, utility representatives, government agencies, business owners, and private homeowners to coordinate requirements for public protection and access to be included in the construction documents. The design Architect will prepare graphics and handouts for these presentations.
6. The design Architect shall include in the fee the costs of meetings with LAUSD and other governmental and permit agencies required to establish an orderly development of the project.
7. The design Architect shall be responsible for printing cost, reproduction, and binding of related documents for the project, unless stated otherwise herein.
8. The design Architect shall furnish to LAUSD one copy on CD/DVD of the project final deliverables in PDF format at the end of the project. The CD/DVD will also include drawings in AutoCAD 2008 and specifications in MS Word.
9. The design Architect shall provide a submittal schedule and update it as required.
10. The design Architect shall prepare monthly progress reports summarizing the actual work performed, project issues, and status of the project schedule and budget. The report will be submitted with each invoice.
11. The design Architect shall record the meeting minutes and shall submit a copy of the minutes to LAUSD within five (5) working days after each meeting.

15.0 Guidelines for Submittals

15.1 Submittal and Plan Check Process

15.1.1 Initial Contact and Submittal Process

For all LAUSD projects, the initial point of contact is the Project Manager for the specific school site. For new school sites, the plans, specifications and construction cost estimates for the recycled water irrigation system will be part of a larger set of construction documents and will follow the submittal process for the entire project as outlined in the LAUSD School Design Guide. For the retrofit of existing irrigation systems, the submittal process for the design plans and construction cost estimates will be independent of a larger set of construction documents and will follow the submittal process outlined as follows in this section. Specifications are not required for submittal with recycled water retrofit designs since equipment models are called out on the plans.

The recycled water use plans shall be submitted to LAUSD for plan check review. Recycled water use plans are submitted for plan check to the Recycled Water Program Coordinator for processing. The plans are then forwarded to the Engineering Branch for plan check and approval.

15.1.2 Plan Check Process

15.1.2.1 Project Start

The District's authorized representative will establish a project start meeting date with the Design Consultant. At this meeting the Consultant will receive design guidelines and available site and other relevant information and directives to allow the work to begin on the assigned project.

The District's authorized representative will issue a notice-to-proceed letter to the Consultant indicating the start and completing dates of the project.

15.1.2.2 Information Gathering

It is important that the public and utility agencies serving the school be involved in the design process from the beginning. Prior to design, the design Architect shall initiate contact with representatives for the following agencies, to inform them of the school's needs and to establish relationships that will assure coordination of their requirements with the school's design.

- Local jurisdiction (City of Los Angeles, County, or other city) for off-site street profiles, curbs and walks, storm drains, and utility services.
- Utility agencies or companies for location of existing and proposed domestic water, reclaimed water, sewer, electric, gas, telephone and telephone cable services.
- Utility companies (Southern California Edison or Southern California Gas Company) for "Savings by Design" application.
- Other agencies for specific project conditions.

15.1.2.3 Blueline Review and Approval Process

- Provide to the District the following items in order to initiate the review and approval process:
 - Three bond copy prints of the water irrigation plans ("24" x 36" preferred).
 - One CD with electronic CAD files (*.dwg, bind all drawings) and PDF files of all drawings.
- The District will file Drawings with appropriate State agencies and will inform the design Architect when State plan check comments have been received.
- An in house review will be completed by the District.
- The design Architect shall pick up drawings and comments from the District and meet with the District's authorized representative to review plan check comments as well as the District review comments, and to establish a written schedule for correcting the documents and meeting with appropriate governmental agencies to obtain their approval.
- The design Architect shall complete corrections indicated by the District and State and resubmit to the District for further review along with the previous comments.
- Once all comments have been incorporated a final set of mylars and a bond copy will be requested for approval signatures.
- Once approval has been granted, the design Architect shall submit to the District:
 - Once set of pink-line (bond duplicate of approved originals)
 - 2 CDs containing .TIFF files or .PDF files of the approved plans.

Mylars will be maintained by the LAUSD Project Manager until the as-built stage, described in Section 23.0.

15.1.2.4 Electronic Review and Approval Process

The electronic review and approval process follows the same steps as the blueline submittal process described above except that all comments will be provided electronically to the design Architect through e-mail of the FTP site. Electronic review is only an option after the second plan check submittal.

15.1.3 FTP Site

Digital files can be uploaded or downloaded from the LAUSD FTP site. To access the site, please coordinate with the LAUSD plan checker for username and password information.

- ZIP the file before uploading
- Password protect the ZIP file
- Use the project name and work order number (supplied by LAUSD) as the name of the zip file
- Upload the file to the location directed by the plan checker.

15.2 Recycled Water Review Checklist

15.2.1 All Sheets

- Plan Size: 24" x 36"
- LAUSD Sheets shall be consecutively numbered and include total number of sheets
- Stamp and signature of licensed California design Architect (current and signed)
- LAUSD title block (lower right corner of all sheets)
- LAUSD approval block
- LAUSD construction note
- Revision block (lower Horizontal)
- Omission Statement
- Potable and recycled water separation note
- Property boundary
- Scale
- North Arrow
- Lettered in a neat and legible style. No hand lettering smaller than 1/8" and no machine lettering smaller than 1/10"

15.2.2 Title Sheet

- Project legal description, APN, tract/parcel map number, project name, site address, etc
- Engineer/architect of work name, address, phone number, CA registration number, expiration date and stamp (current and signed)
- Declaration of responsible charge (Date and Signature)
- Index of sheets (LAUSD sheet numbers)
- Vicinity map of general area showing project site, major streets, north arrow and project boundary.
- Work order number located top right corner, vertically, 1" minimum letter size
- System meter information table
- Landscape maintenance responsibility note
- Time limitation note
- LAUSD Onsite landscape irrigation disclaimer
- Responsibility disclaimer
- LAUSD on-site recycled water notes (if space permits - otherwise on index map sheet)

15.2.3 Index Map Sheet

- Maximum scale is 1"=100' (Index Map should be an overview of the entire project)
- North arrow, street names, and existing/proposed utilities
- Show existing (and proposed if applicable) utilities in streets: type, size, and class of pipe using leader lines for reference.-must match exhibit
- Show location of recycled water warning sign - The design location for warning signs shall be called out at all driveway entrances, walkway entrances, recycled water meters and posted every 500' along fence lines.
- Point of connection information callout examples
 - Existing service: Point of connection "A"
 - Station XX+XX per D-XXXX, connect to existing X" service and install X" landscape meter
 - No connection exists Steel ("HOT TAP"): Point of connection "A"
 - Station XX+XX per D-XXXX, hot tap existing X" R/W/L with X" x X" saddled outlet connection with X" FxF RSGV at developers expense. Install X" landscape service
 - No connection exists DI, PVC, or ACP ("HOT TAP"): Point of connection "A"
 - Station XX+SS per D-XXXX, hot tap existing X" R/W/L with X" x X" tapping sleeve with X" FxF RSGV at developers expense. Install X" landscape service
- Location of meters (Recycled and Potable)
- Show all constant pressure lines, mainline valves and POC equipment.
- Location of all public facilities including designated tot lots, food preparation and picnic areas are clearly defined and labeled on plans (see list of items on omission statement).
- Drinking and decorative fountains, potable water lines to building & restrooms are clearly defined and labeled on plans
- Sheet layout matches plans
- Size of mainlines is shown and matches irrigation sheets. Sheet number references to irrigation plans
- Legend identifying all equipment shown on index map

15.2.4 Irrigation Plan Sheets

- POC meter data table: at each meter location, on irrigation sheet
- Indicate meter size, size of connection lateral, and size /type of mainline tying in to (inches)
- Size and type of irrigation mains shall match index map
- All irrigation plan sheets to have same scale
- Street names
- Matchlines
- Key map

15.2.5 Legend Sheet

- Color coding note
- Quick Coupler valve: Nelson 7645 acme threads, with locking purple cap. (or Toro 474-44)
- Recycled water meter

- Recycled water strainer shall be Yardney T Series Maxi-Clean or approved equal, installed above ground, and same size as service meter.
- Backflow prevention device is not required for recycled water system (entire system is already protected with a backflow at the street interconnect) unless the system proposes a direct potable connection or the use of chemical injection system.
- If BP required (see Section 12.1, items 10) and 11)), add the following note under BP detail. "Backflow prevention device shall be selected from the USC Approved List of Assemblies, meet the requirement of LAUSD standard drawings and shall be installed per the current LAUSD Standards and Specifications"
- Recycled water Constant pressure mainline minimum pipe class:
 - 4" - 6" PVC shall be CL 200, C-900 (purple)
 - 2" - 3" PVC shall be CL 315 (purple)
 - 2" and smaller PVC shall be Schedule 40 (purple)
- Recycled water mainline minimum depth: Constant pressure lines 6" = 36" deep. Constant pressure lines 3" & 4" = 24" deep. Constant pressure lines 2-1/2" and smaller = 18" deep. Intermittent pressure lines = 12" deep.
- Size and maximum flow rate of recycled water meter: 2" = 160 GPM, 3" = 350 GPM, 4" = 1,000 GPM, 6" = 2,000 GPM
- Add the following note to the details and specifications sheets: "The materials and the installation of the irrigation system shown on this plan shall meet the latest LAUSD Standards and Specifications. Installation of hose bibbs is not allowed on systems using recycled water".

15.2.6 General Consideration

- Hose bibb connections and fire hydrants are not permitted on the recycled water system.
- Quick Coupler valve shall be of a type approved for recycled water use.
- Dual source systems (site with recycled and potable water) require cross connection shutdown testing.
- Agricultural areas and gardens are not permitted on the recycled water system.

15.3 Notes Required on Plans

15.3.1 System Meter Information Table

POC "X"	POC STATION	CIVIL DRAWING NUMBER	IRRIGATED AREA (SF)	DEMAND (GPM)	ANNUAL USAGE (ACRE-FT)	LATERAL SIZE (IN)	METER SIZE (IN)
TOTAL							

15.3.2 LAUSD On-Site Landscape Irrigation Disclaimer

(Title sheet only)

LAUSD'S REVIEW AND APPROVAL OF THE LANDSCAPE DRAWINGS ARE FOR THE PURPOSES OF POINT OF CONNECTION (POC) AND SYSTEM DEMAND DATA ACQUISITION AND DEPARTMENT OF PUBLIC HEALTH USE REQUIREMENTS ONLY AND DOES NOT REPRESENT AN ENDORSEMENT OR APPROVAL OF THE HYDRAULIC ADEQUACY AND RELIABILITY OF THE PLANNED IRRIGATION SYSTEM DESIGN. THE ULTIMATE DESIGN OF THE IRRIGATION SYSTEM SHOULD ACCOUNT FOR PRESSURE FLUCTUATIONS THAT ARE COMMON WITHIN THE RECYCLED WATER DISTRIBUTION SYSTEM AND INCLUDE INSTALLATION OF A PUMP (WITH LOW FLOW / LOW PRESSURE CUT OFF SWITCH), TO ENSURE ADEQUATE SYSTEM WATER PRESSURE FOR IRRIGATION.

15.3.3 Site Supervisor Maintenance Responsibility Note

(Title sheet only)

IT SHALL BE THE RESPONSIBILITY OF THE SITE SUPERVISOR TO MAINTAIN ALL ON SITE RECYCLED WATER IRRIGATION AND POTABLE WATER SYSTEMS AND TO COORDINATE WITH THE CROSS-CONNECTION CONTROL PROGRAM OF THE LADWP AND THE LACDPH.

15.3.4 Responsibility Disclaimer

(Title sheet only)

ALL FACILITIES, EXISTING OR PROPOSED, WERE OBTAINED FROM RECORD DRAWING _____ (DRAWING NUMBER). ACTUAL SIZE AND LOCATION OF FACILITIES SHALL BE VERIFIED. CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITIES TO VERIFY TIE-IN LOCATIONS, PIPE SIZE AND TYPE PRIOR TO ANY WORK BEING PERFORMED. TO THE BEST OF OUR KNOWLEDGE THE FACILITIES EXIST OR WILL EXIST AS SHOWN. THE LAUSD AND (DESIGN CONSULTANT) _____ SHALL NOT BE HELD RESPONSIBLE FOR ACTUAL SIZE AND LOCATION. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE DISTRICT ENGINEER

15.3.5 Declaration of Responsible Charge

(Title sheet only)

I HEREBY DECLARE THAT I AM THE DESIGN ARCHITECT OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THIS PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF THE PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF _____, THE COUNTY OF _____, THE RECREATION DISTRICT OF _____, AND THE LAUSD IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS THE DESIGN ARCHITECT OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

FIRM NAME & ADDRESS:

 SIGNATURE

DATE

REGISTRATION NO. _____

15.3.6 LAUSD Construction Note

(All sheets)

LOS ANGELES UNIFIED SCHOOL DISTRICT REQUIRES THAT A PRE-CONSTRUCTION CONFERENCE BE SCHEDULED PRIOR TO ANY CONSTRUCTION BY CALLING THE LOS ANGELES UNIFIED SCHOOL DISTRICT ENGINEERING DEPARTMENT AT _____.

15.3.7 Omission Statement

(All sheets)

THERE ARE NO DRINKING FOUNTAINS, DECORATIVE FOUNTAINS, COMFORT STATIONS, OUTDOOR EATING AREAS, SWIMMING POOLS, PLAYGROUND EQUIPMENT, WELLS OR AGRICULTURAL AREAS & GARDENS ON THE SITE.

(IF ONE OR MORE OF THE LISTED ITEMS ABOVE ARE EXISTING ON SITE, EACH MUST BE CLEARLY LABELED ON PLAN AND NOTE SHALL READ AS THE FOLLOWING EXAMPLE.)

(DRINKING WATER FOUNTAINS, DESIGNATED OUTDOOR EATING AREAS POOLS...)

SHALL BE PROTECTED AGAINST CONTACT WITH RECYCLED WATER SPRAY, MIST, OR RUN-OFF. THE POTABLE WATERLINE SUPPLYING THE DRINKING FOUNTAIN MUST HAVE A WARNING BLUE COLORED TAPE IDENTIFYING IT AS A POTABLE WATERLINE AND STATING "CAUTION: BURIED WATERLINE BELOW" INSTALLED OVER IT.

15.3.8 Potable Recycled Water Separation Note

(All sheets)

RECYCLED MAINLINE (CONSTANT PRESSURE) SHOWN DIAGRAMMATICALLY FOR CLARITY ONLY. ACTUAL LOCATION MUST PROVIDE A MINIMUM TEN (10) FEET HORIZONTAL CLEARANCE BETWEEN ALL POTABLE AND CONSTANT PRESSURE RECYCLED WATERLINES. RECYCLED WATER MAINLINE SHOULD BE INSTALLED UNDER POTABLE WATERLINES AND MAINTAIN ONE (1) FOOT OF VERTICAL CLEARANCE. WHERE, DUE TO SPACE CONSTRAINTS, THE LINES HAVE ONLY BETWEEN 4 FEET AND 10 FEET SEPARATION, THE RECYCLED WATER LINE SHALL BE SLEEVED. WHERE THE RECYCLED WATER CONSTANT PRESSURE LINE MUST BE INSTALLED ABOVE THE POTABLE WATERLINE, A FOUR (4) INCH MINIMUM VERTICAL CLEARANCE MUST BE MAINTAINED AND THE RECYCLED WATER PRESSURE LINE MUST BE INSTALLED IN A CONTINUOUS PVC CLASS 200 PIPE OR GREATER SLEEVE WHICH EXTENDS A MINIMUM OF TEN (10) FEET EACH SIDE OF THE POTABLE WATERLINE.

15.3.9 Color Coding

(Legend Table, Irrigation Legend and Details sheets)

SPRINKLERS, ROTOR HEADS AND OTHER TYPES OF DISPERSION HEADS SHALL HAVE THE EXPOSED SURFACE COLORED PURPLE. THE EXPOSED SURFACE SHALL BE COLORED THROUGH THE USE OF INTEGRALLY MOLDED PURPLE PLASTIC OR PERMANENTLY ATTACHED PURPLE PLASTIC RING OR DISC. VALVE BOXES SHALL BE PURPLE PER INDUSTRY STANDARDS. THE LIDS SHALL HAVE THE WARNING “RECYCLED: DO NOT DRINK” IN ENGLISH AND SPANISH AND THE INTERNATIONAL “DO NOT DRINK” ON ONE SIDE AND “PELIGRO: AGUA IMPURA-NO BEBER” ON THE OPPOSITE SIDE. ALL SHRUB HEADS SHALL HAVE PURPLE CAPS.

15.3.10 Point of Connection (POC) Information Meter Data Table

(Next to the irrigation plan POC)

POINT OF CONNECTION “X”	
P.O.C. DESIGNATION	X
ROAD STATION	
SERVICE LINE SIZE (in)	
RECYCLED WATER METER SIZE (in)	
ULTIMATE DESIGN MAX FLOW (gpm)	
CHEMICAL INJECTION SYSTEM (Y/N)	
BOOSTER PUMP HGL (ft)	
METER ELEVATION (ft)	
PRESSURE RANGE (STATIC) (psi)	FROM_____ TO_____
DESIGN PRESSURE (psi)	
TOTAL AREA SERVED (sf)	
ANNUAL WATER USAGE (acre-ft)	
LAUSD REFERENCE CIVIL DRAWING NUMBER	D#_____
INITIAL SOURCE OF WATER SUPPLY	
IRRIGATION TYPE (rotors, pop-up spray, bubbler)	

15.3.11 Installation Notes

(Irrigation Legend, Detail, and Specification sheets)

NOTES:

1. THE MATERIALS AND THE INSTALLATION OF THE IRRIGATION SYSTEM SHOWN ON THIS PLAN SHALL MEET THE LATEST LAUSD STANDARDS AND SPECIFICATIONS FOR DEVELOPER PROJECTS.
2. NO HOSE BIBBS WILL BE ALLOWED FOR INSTALLATION ON SYSTEMS USING RECYCLED WATER.

15.3.12 LAUSD Recycled Water General Notes

Provide the following standard notes on the recycled water irrigation drawings under the heading “Recycled Water Notes – Los Angeles Unified School District”

1. THE RECYCLED WATER SYSTEM SHOWN ON THESE PLANS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE MOST RECENT EDITION OF THE LOS ANGELES UNIFIED SCHOOL DISTRICT STANDARDS AND SPECIFICATIONS FOR DEVELOPER'S PROJECTS.
2. USE OF RECYCLED WATER SHALL ADHERE TO TITLE 22, DIVISION 4, CHAPTER 3 OF THE CALIFORNIA CODE OF REGULATIONS AND THE CURRENT RULES, ORDINANCES, REGULATIONS AND SPECIFICATIONS OF THE DISTRICT.
3. LOS ANGELES UNIFIED SCHOOL DISTRICT REQUIRES THAT A PRECONSTRUCTION CONFERENCE BE SCHEDULED PRIOR TO ANY CONSTRUCTION BY CALLING THE LOS ANGELES UNIFIED SCHOOL DISTRICT'S FIELD ENGINEERING DEPARTMENT AT _____.
4. THE LOS ANGELES UNIFIED SCHOOL DISTRICT OPERATION DEPARTMENT SHALL BE NOTIFIED TWO WORKING DAYS PRIOR TO THE START OF CONSTRUCTION AT _____. ALL WORK PERFORMED WITHOUT BENEFIT OF INSPECTION SHALL BE SUBJECT TO REJECTION AND REMOVAL.
5. CROSS CONNECTIONS BETWEEN RECYCLED WATER LINES AND POTABLE WATER LINES ARE STRICTLY PROHIBITED. FINES MAY BE LEVIED.
6. NON-DESIGNATED USE AREAS SHALL BE PROTECTED FROM CONTACT WITH RECYCLED WATER, CAUSED BY WINDBLOWN SPRAY, IRRIGATION DESIGN OR UNAUTHORIZED USE. LACK OF PREVENTION, WHETHER BY DESIGN, CONSTRUCTION PRACTICE, OR SYSTEM OPERATION, IS STRICTLY PROHIBITED.
7. RECYCLED WATER IRRIGATION CANNOT BE USED IN THE VICINITY OF WATER RECREATION AREAS, WHERE RECYCLED WATER MIST CAN CONTACT WATER RECREATION AREAS.
8. HOSE BIBBS ARE STRICTLY PROHIBITED ON RECYCLED WATER SYSTEMS.
9. FOOD PREPARATION, OUTDOOR EATING AREAS, AND DESIGNATED CHILDREN PLAY EQUIPMENT MUST NOT BE SUBJECTED TO RECYCLED WATER OVERSPRAY, RUNOFF OR PONDING. TYPICAL WAYS OF ACCOMPLISHING THIS IS BY SELECTION OF LANDSCAPE MATERIALS OR BY DESIGN SUCH AS UTILIZING LOW TRAJECTORY ROTORS OR BUBBLER IRRIGATION.
10. NO PONDING, RUNOFF OR OVERSPRAY IS PERMITTED. ADJUST ALL SPRINKLER HEADS TO MINIMIZE OVERSPRAY ONTO SIDEWALKS, STREETS DRINKING AND DECORATIVE FOUNTAINS, COMFORT STATIONS, PLAYGROUND EQUIPMENT, PICNIC TABLES, BBQ, PRIVATE LOTS, ETC.
11. ALL ON-SITE RECYCLED WATER PIPING INSTALLED ON THIS PROJECT SHALL BE PURPLE IN COLOR, PANTONE 522C AND IDENTIFIED IN ACCORDANCE WITH THE CURRENT CDPH GUIDELINES AND LOS ANGELES UNIFIED SCHOOL DISTRICTS STANDARDS AND SPECIFICATIONS.

12. SIGNS OR DECALS WITH “RECYCLED WATER, DO NOT DRINK” AND THE DO NOT DRINK SYMBOL MUST BE POSTED ON PUMP CABINETS AND CONTROLLER STATIONS. RECYCLED WATER SPRINKLERS / SPRAY HEADS MUST HAVE PURPLE CAPS, PURPLE COLLARS, AND THE RISERS HAVE A RECYCLED WATER DECAL. LARGE THROW HEADS MUST HAVE PURPLE INSERTS. PURPLE CAPS AND COLLARS MUST BE FIRMLY AFFIXED TO SPRINKLER HEADS. ALL OTHER ABOVE GROUND EQUIPMENTS MUST BE COLORED PURPLE OR HAVE A “RECYCLED WATER, DO NOT DRINK” DECAL OR SIGN.
13. INSTALL SIGNAGE REGARDING RENOVATION OF EXISTING IRRIGATION SYSTEM. SIGNAGE SHOULD BE IN LOCATION WHERE IT WILL BE EASILY SEEN BY ANYONE THAT WILL BE DOING WORK ON THE SYSTEM (E.G. MAIN CONTROLLER/ SHUT OFF VALVE). SIGN SHOULD STATE THAT RECYCLED WATER IS USED ON SITE AND DHS AND DWP (OR LOCAL WATER PURVEYOR) MUST BE NOTIFIED PRIOR TO ANY RENOVATION ON THE EXISTING SYSTEM.
14. ALL VALVE CAPS FOR ON-SITE BURIED GATE VALVES SHALL BE TRIANGULAR IN SHAPE WITH THE WORDS “RECYCLED WATER” THEREON PER STANDARD DRAWING IRR-016.
15. WARNING TAPE FOR THE RECYCLED WATER PIPING SHALL BE PURPLE IN COLOR, PANTONE 522C, WITH THE WORDS “CAUTION: RECYCLED WATER” IMPRINTED IN MINIMUM 1 INCH HIGH LETTERS BLACK IN COLOR. IMPRINTING SHALL BE CONTINUOUS AND PERMANENT. WARNING TAPE SHALL BE METALLIC AND DETECTABLE.
16. ALL AUTOMATIC CONTROLLERS MUST BE SET TO OPERATE BETWEEN THE HOURS OF 9:00 P.M. AND 4:00 A.M. UNLESS OTHERWISE PERMITTED BY THE DISTRICT.
17. WARNING SIGNS AND LABELS SHALL READ “CAUTION: RECYCLED WATER DO NOT DRINK”, AND SHALL BE IN BOTH ENGLISH AND IN SPANISH. THE SIGNS SHALL INCLUDE THE INTERNATIONAL SYMBOL FOR DO NOT DRINK. THE DESIGN LOCATION FOR WARNING SIGNS SHALL BE CALLED OUT ON THE PLANS AT ALL DRIVEWAY ENTRANCES, WALKWAY ENTRANCES, RECYCLED WATER METERS AND POSTED EVERY 500' ALONG FENCE LINES. FINAL FIELD LOCATIONS SHALL BE AS DIRECTED BY THE DISTRICT REPRESENTATIVE AND ASBUILT.
18. WHEN POTABLE WATER IS ONSITE, THE REQUIRED DEPARTMENT OF HEALTH TITLE 22 CROSS CONNECTION SHUTDOWN TEST SHALL PRECEDE THE FINAL RELEASE OF THE IRRIGATION SYSTEM. THIS TEST WILL BE CONDUCTED BY LAUSD’S WATER OPERATIONS DEPARTMENT.
19. ALL PUBLIC AND PRIVATE POTABLE WATER MAINS INCLUDING FIRE MAINS AND ANY WATER WELLS AND WATER COURSES WITHIN THE RECYCLED WATER PROJECT SHALL BE SHOWN ON THE PLANS.

QUICK COUPLER KEY WITH AN ACME THREAD FOR OPENING AND CLOSING THE VALVE. QUICK COUPLING VALVES SHALL BE OF A TYPE APPROVED FOR RECYCLED WATER USE. QUICK COUPLER VALVES CANNOT BE LOCATED WITHIN 50 FEET OF FOOD PREPARATION, OUTDOOR EATING AREAS, OR DESIGNATED CHILDREN PLAY EQUIPMENT OR WITHIN THE FENCED PERIMETER SURROUNDING SWIMMING POOLS. PRIOR TO THE FINAL COVERAGE TEST, ONE (1) COMPLETE SET OF LAMINATED CONTROLLER CHARTS AND IRRIGATION AS-BUILT DRAWINGS SHALL BE PROVIDED TO THE DISTRICT. AT THE DISTRICT'S DISCRETION, A SECOND COPY OF CONTROLLER CHARTS SHALL BE PLACED IN THE CONTROLLER CABINET.

28. POTABLE QUICK COUPLERS ARE NOT ALLOWED WITHIN THE RECYCLED WATER IRRIGATED AREA. POTABLE QUICK COUPLERS SHALL BE THE LUG TYPE.
29. EACH AUTOMATIC CONTROLLER AND ITS ASSOCIATED EQUIPMENT SHALL BE IDENTIFIED WITH A SIGN BEARING THE WORDS "CAUTION: RECYCLED WATER DO NOT DRINK" IN ENGLISH AND SPANISH, WITH BLACK LETTERS AT LEAST 1 INCH HIGH ON A PURPLE BACKGROUND AND WITH A "DO NOT DRINK" SYMBOL SIGN. THE SIGNS SHALL BE PLACED AS TO BE READILY SEEN BY ANY OPERATIONS PERSONNEL UTILIZING THE EQUIPMENT.
30. INTERCONNECTION OF IRRIGATION PRESSURE SUPPLY LINES ORIGINATING FROM MORE THAN ONE METER IS STRICTLY PROHIBITED.

FAILURE TO COMPLY WITH THESE NOTES AND THE DISTRICT'S RULES AND REGULATIONS IS A VIOLATION AND COULD RESULT IN SUSPENSION OF SERVICE UNTIL THE APPROPRIATE CORRECTIVE STEPS HAVE BEEN TAKEN.

15.3.13 Plan Review Checklist

The checklist on the following page shall be used for plan check review on each submittal.

15.4 Construction Cost Estimate

A Construction Cost Estimate shall be provided to the LAUSD Project Manager with all final recycled water irrigation submittals. The cost estimate shall include the line item cost of all irrigation components involved in the design as well as an estimate of labor hours required to perform the work.

15.5 Submittal Milestones

For the design of new recycled water irrigation systems, the design Architect shall submit plans, specifications and construction cost estimate according to the project schedule. For the retrofit of existing irrigation systems for use with recycled water, the design Architect will generally submit plans at the following milestones during the retrofit process. Also, refer to the Approval Process Diagram included in Section 1.0 of this Project Plan.

- Draft Submittal after the initial site visit
- 50% Submittal after CDPH and LAUSD review
- Final Submittal after Site Shutdown



Los Angeles Unified School District
Recycled Water Use Sites

Project Name _____
LAUSD W.O. _____
Date _____

Checklist #3 - Submittal Checklist

LAUSD uses this checklist during plan check review.

Item	Comments
<p>All Sheets</p> <p>_____ 24" x 36" bond sheets preferred</p> <p>_____ Marked with name, address and telephone number of firm preparing the plans and date of preparation</p> <p>_____ Consecutively numbered with total number of sheets</p> <p>_____ Lettered in neat legible style, no hand writing</p> <p>_____ LAUSD CAD Border</p> <p>_____ LAUSD Logo</p> <p>Title Sheet</p> <p>_____ Project name & address, project directory w/ all consultants</p> <p>_____ List all drawings planned for final set. Indicate those included.</p> <p>_____ Legend, Abbreviations, Symbols (LAUSD Approved)</p> <p>_____ Vicinity Map</p> <p>_____ Key Map with hydrants, point of connection, all irrigation meters, street names, sign locations, project boundry</p> <p>_____ Drawing Index</p> <p>_____ General Notes</p> <p>_____ Signature Block for LAUSD</p> <p>_____ Signature Block for State Agencies Approving Plans</p> <p>_____ Declaration of Responsible Charge</p> <p>_____ Responsibility Disclaimer</p> <p>_____ LAUSD On-Site Landscape Irrigation Disclaimer</p> <p>_____ Landscape Maintenance Responsibility Note</p> <p>_____ LAUSD Construction Note</p> <p>_____ Meter Information Table</p> <p>_____ Color Coding</p> <p>_____ Omission Statement</p> <p>_____ North Arrow</p> <p>_____ Potable and Recycled Water Separation Note</p> <p>_____ APN or site address</p>	



Los Angeles Unified School District
Recycled Water Use Sites

Project Name _____
LAUSD W.O. _____
Date _____

Checklist #3 - Submittal Checklist

LAUSD uses this checklist during plan check review.

Item	Comments
<p>Legend, Detail and Specs</p> <ul style="list-style-type: none">___ Non-standard symbols and abbreviations___ For sprinklers, show radius & pattern, flow pressure, material, manufactured and model number___ Show symbols for potable water meter and potable mains___ Show quick coupler and cross connection test station details___ Pressure regulator or regulator Master Valve at POC___ Show potable/recycled crossing trench details___ LAUSD Recycled Water Notes___ POC Meter Data Table___ Installation Note <p>Irrigation Plans</p> <ul style="list-style-type: none">___ Planting areas and identify plant type___ Location of existing trees (to remain) in area of work and proposed relocation if necessary___ Plant schedules - names, sized, detail references___ Piping, sprinkler & controller locations, references___ Water POC, meter & backflow preventor locations___ Valves, control schedules	

16.0 List of Approved Materials

All materials used in a recycled water system must be approved for recycled water use and installed according to the approved plans. The approved materials for use in LAUSD irrigation systems are included in LAUSD Specification Section 02810 Irrigation Systems. The following requirements follow the Los Angeles County Recycled Water Advisory Committee's Recycled Water User Manual and shall also be followed for recycled water use sites.

16.1 Below Grade

16.1.1 New Recycled Water Lines

All new, buried recycled water piping must be extruded, purple colored, Schedule 40 minimum, PVC pipe with continuous wording "CAUTION – RECYLED WATER" printed on opposite sides of the pipe.

Recycled water piping under pavement or crossing potable water lines shall be sleeved, with the sleeve being at least two (2) inches larger in diameter than the recycled water pipe.

When recycled water lines cross potable water lines, the pipe shall be sleeved for ten (10) feet on either side of the crossing, for a minimum of twenty (20) feet total length of sleeving, whenever possible. In addition, the crossing recycled water line shall be at least 1-foot below the potable water line, whenever possible. If the crossing recycled water line must be installed above the potable water line, a 4 inch minimum vertical clearance must be maintained. If a recycled water line is parallel to a potable water line, the lines must have at least 10 feet separation. If, due to space constraints, the lines have only between 4 feet and 10 feet separation, the recycled water line shall be sleeved. Horizontal separation between recycled water and potable water pipelines shall not be less than 4 feet.

16.1.2 New Potable Water Lines

All new buried potable water lines shall be identified with blue tape with white contrasting lettering bearing the wording "POTABLE WATER" affixed at 10-foot intervals along the top of all potable water piping. Identification tape shall extend to all valve boxes, vaults and exposed piping. Identification tape is not required if extruded, blue colored PVC with continuous wording "POTABLE WATER" printed on opposite sides of the pipe is used.

16.1.3 New Non-Potable Water Lines

All new buried non-potable water lines shall be identified with yellow tape with contrasting lettering bearing the wording "NON-POTABLE WATER – DO NOT DRINK" affixed at 10-foot intervals along the top of all non-potable water piping. Identification tape shall extend to all valve boxes, vaults and exposed piping.

16.1.4 Existing Below Grade Pipelines

Existing below grade pipelines do not need to be marked unless the pipeline becomes exposed during construction of new pipelines or maintenance of the existing pipeline. The exposed section of pipe shall be appropriately marked as recycled, potable or non-potable.

16.2 Above Grade

All above grade recycled water piping shall be labeled as such and colored purple. If purple pipe is not used, recycled water piping shall be wrapped with purple tape with black or white contrasting lettering bearing the wording “CAUTION – RECYLED WATER” shown. All recycled water fittings shall be replaced with appropriate purple fittings or painted purple.

Above grade potable water pipelines shall be labeled and colored blue. Potable water lines may be wrapped with blue tape with white contrasting lettering bearing the wording “POTABLE WATER” shown.

Above grade non-potable water pipelines shall be labeled and colored yellow. Non-potable water lines may be wrapped with yellow tape with contrasting lettering bearing the wording “NON-POTABLE WATER – DO NOT DRINK” shown.

Valve boxes, vaults, quick coupling valves and other fittings must be colored, labeled or tagged such that there is a clear differentiation between recycled water and other types of water lines.

Tags shall be identified with the appropriate wording on both sides. Recycled water tags shall have both the appropriate wording and the “Do Not Drink” symbol.

16.3 Valves

16.3.1 Quick Coupling Valves

New quick coupling valves shall be made specifically for recycled water use, be $\frac{3}{4}$ or 1 inch nominal size, and be made of brass with a working pressure of 150 psi. The covers on all new quick coupling valves shall be permanently attached and made of purple rubber or vinyl with the words “RECYCLED WATER” on the cover, and must have a lock. The valve shall be opened and closed only with a coupler key with an acme thread. All new and existing quick coupling valves shall be tagged and installed in a purple valve box.

16.3.2 Other Valves

New valves shall be tagged and installed in a purple valve box.

16.4 Backflow Preventers

Backflow preventers shall be selected from the University of Southern California (USC) List of Approved Assemblies. This list is updated quarterly, and backflow prevention assemblies are approved for a period of three years and approval is subject to renewal. Access to the list requires Foundation Membership. All information on the USC List of Approved Assemblies and obtaining membership can be found at <http://www.usc.edu/dept/fccchr/>

16.5 Sprinklers

New sprinklers shall be approved for use with recycled water, with anti-drain valves as needed.

16.6 Irrigation Controllers

New irrigation controllers shall be automatic, smart controllers, comply with District and AB-1881 requirements, and have multiple start/stop times for any 24 hour period. All controllers must be marked with the words “RECYCLED WATER” in black letters on purple background.

16.7 Other Irrigation Fittings

All other devices, including but not limited to valves, pumps, etc must be tagged or labeled, clearly indicating the source of water, whether recycled, potable or non-potable as discussed in Section 16.1.

16.8 Signage

Signage communicating the use of recycled water on the site is required at all entrances to the site, all high traffic areas, and placed where the sign can be easily seen. The sign shall clearly indicate that recycled water is in use with the words “RECYCLED WATER – DO NOT DRINK” and the “Do Not Drink” symbol. The sign shall also state “Do Not Drink” in both English and Spanish, or other locally used language.



“Do Not Drink” Symbol

17.0 Plan Requirements

Developing design plans for new sites that will have a recycled water irrigation system shall follow the standards and guidelines found throughout this Recycled Water Use Project Plan. Guidelines for CDPH approval in the following Section 18.0 shall also be followed for new systems.

In order to finalize the retrofit design plans for recycled water use on LAUSD sites with an existing irrigation system, an initial shutdown test shall be performed by the site maintenance personnel with oversight from the Los Angeles County Department of Public Health for all sites within the County of Los Angeles and according to the guidelines established by the CDPH, American Water Works Association and “Appendix J” of the Uniform Plumbing Code (UPC). The design Architect shall be present during the initial shutdown to record existing conditions and to make note of and address any design issues during the design process.

Initial shut down testing of sites during the design phase shall be performed with a LACDPH representative on site. The purpose of performing the initial shut down test is to verify existing irrigation plans, system operation and to verify that the potable system is separate from the irrigation system. All meter locations, backflow devices and water fixtures for the work site shall be identified prior to field testing.

Procedures for shut down testing typically include:

- All potable connections on site shall be opened to verify that water flows through all connections. All irrigation controller stations and connections shall be operated to verify that all irrigation connections operate. All potable and irrigation connections should then be closed after verification.
- Shutdown of the potable system shall be performed by site maintenance personnel with LACDPH oversight. Maintain connection of irrigation system to water supply.
- All potable connections on site shall be retested to verify that water pressure is zero through all connections. All irrigation controller stations and connections shall be operated to verify that all irrigation connections continue to operate with potable system shutdown. All potable and irrigation connections should then be closed after verification.
- Shutdown of the irrigation system shall be performed by site maintenance personnel with LACDPH oversight. Reintroduce flow to the potable system slowly, being careful not to create water hammer.
- All irrigation controller stations and connections on site shall be retested to verify that water pressure is zero through all irrigation connections. All potable connections shall be operated to verify that all potable connections operate independently from the irrigation system shutdown. All potable and irrigation connections should then be closed after verification. Reintroduce flow to the potable system slowly, being careful not to create water hammer.

Once an initial shutdown of the site is performed, the designer should have the existing field verified information required to design the recycled water retrofit. A final plan set can then be submitted to the LAUSD Project Manager for final approval by the CDPH and for bidding and/or construction. The following Section 18.0 discusses the process for CDPH approval.

Occasionally, a shutdown test may be performed during the initial school site visit. This is a great opportunity to verify the as-built information and to identify any possible cross connections or difficulties that may be encountered in retrofitting the system for recycled water use.

18.0 Guidelines for CDPH Approval

The requirements under the California Department of Health Services Recycled Water-Related Statutes and Regulations shall be followed.

In addition, the Los Angeles Department of Public Health guidelines in A Guide to Recycled Wastewater Use, Pipeline Construction and Installation and Cross-Connection Plan Approval Application requirements shall be met. The CDPH has authorized the Los Angeles Department of Public Health to conduct recycled water project reviews within Los Angeles County.

Some key points to consider when preparing plans for recycled water use so that they are approved quickly are:

- All water meters, recycled water meters and connections to the building, including the reduced pressure principle device (RPPD) with location, size, make, model and serial number on the potable or fire connections. When possible, include the peak flow through the meters (gpm), the static design pressure at the meters (psi), area served through the meter (sq feet or acres), and an estimate of the yearly amount of water served (acre-feet).
- Text from “Guidelines for Pipeline Construction and Installation – For the Safe Use of Recycled / Reclaimed Wastewater” shall be included on the plans as an addendum to the General Notes.
- Plans must indicate the pipe separation requirements.
- All water connections shall be shown, including but not limited to, quick couplers, valve boxes, controllers, sprinklers, drinking fountains, backflow devices, water closets, etc.
- All drinking fountains, decorative fountains, comfort stations, outdoor eating areas, swimming pools, playground equipment, wells or agricultural areas & gardens on the site shall be shown on the plans. Each of these items must be clearly labeled on plan. These areas shall be protected against contact with recycled water spray, mist, or run-off. The potable waterline supplying any drinking fountain must have a warning blue colored tape identifying it as a potable waterline and stating “caution: buried waterline below” installed over it.
- All internal backflow devices must be shown.
- All water lines must be uniquely identified on the plans and the corresponding legend. The legend must also show all connections and irrigation appurtenances.
- Show the connection of potable water in the street to the meter or curb.
- An approved backflow prevention device on the potable service(s), installed as close to the meter(s) as possible must be provided for sites using recycled water.
- An approved backflow prevention device on recycled water service(s), installed as close to the meter(s) as possible, where chemical injection on the onsite recycled water system will be used, must be provided.
- Signs indicating recycled water use on the site must be shown at all entrances to the site.
- All fire service connections, location, and backflow device information.
- The design Architect shall coordinate with LACDPH to have a representative of LACDPH present during initial site visits, site shutdowns, final site walkthrough for approval of plans and prior to backfilling of any pipeline trenches during the construction phase.

CONSTRUCTION PHASE

This Chapter provides guidelines for general construction, inspection, field testing, final inspection and acceptance of as-built drawings.

19.0 Construction Guidelines

The contractor is required to coordinate with LADWP, LAUSD, LACDPH and the site supervisor during the construction of the project. Bi-weekly meetings will also be held during the Construction phase.

The contractor shall study the different construction methods that can be applied to the project. There are multiple methods of construction that can be implemented depending if the scope includes all new construction, retrofit of above ground work and/or retrofit of below grade work. Each of these methods has many advantages and disadvantages.

The contractor shall evaluate the potential impacts in certain areas, such as major thoroughfares, as impacts to these areas may be minimized via trenchless operations. The goal is to minimize the impact on either the overall community traffic or other large utilities, such as storm drains, without increasing the construction costs from conventional cut and cover. Different construction techniques which appear to be feasible should be given consideration early in the design process.

The contractor shall evaluate construction methods using available data and other data that will be provided by LAUSD. Early in the construction phase of the project, the contractor shall evaluate the alternative methods of construction and meet with LAUSD staff to collectively determine the most feasible and economical method of construction by evaluating the major types of trenchless and conventional cut and cover methods of construction. A memo shall be submitted to LAUSD which summarizes the findings and recommendations.

The contractor shall coordinate efforts, monitor schedules and budgets, and administer the contract with LAUSD.

The contractor shall include in the fee the costs of meetings with LAUSD and other governmental and permit agencies required to establish an orderly development of the project.

The contractor shall be responsible for printing cost, reproduction, and binding of related documents for the project, unless stated otherwise herein.

The contractor shall provide a schedule and update it as required.

The contractor shall prepare monthly progress reports summarizing the actual work performed, project issues, and status of the project schedule and budget. The report will be submitted with each invoice.

20.0 Inspection Guidelines

The inspection of the recycled water construction shall be performed continuously throughout construction, ensuring that the recycled water and potable systems are constructed per the approved design plans and specifications and per LAUSD standards.

The following inspection list can be used as a guide for inspection during construction.

- 1) Narrow or irregularly shaped shrub areas less than eight (8) feet wide use low volume pop-up bubbler irrigation.
- 2) Mulched areas use low volume pop-up bubbler irrigation.
- 3) There are no turf areas less than eight (8) feet wide.
- 4) Turf areas have a minimum of 24" offset of permeable paving adjacent to all hardscape.
- 5) Slopes greater than 25% are irrigated with a precipitation rate less than 0.75 inches per hour. For larger slopes, overhead irrigation is acceptable.
- 6) No planting occurs within 24" of hardscape.
- 7) Irrigation heads are spaced a minimum of 24" off of hardscape. This includes hydro seeded areas.
- 8) No mulch is used for overhead irrigated areas.
- 9) For smaller slopes and slopes with mulch, low volume bubblers are placed for each plant and each tree has deep well bubblers as indicated in item 1 & 2 above.
- 10) There is no drip irrigation used on site.
- 11) Drinking fountains are protected from the direct spray of recycled water by either physical boundary or proper separation.
- 12) An approved backflow prevention device is installed on the potable service(s), as close to the meter(s) as possible.
- 13) An approved backflow prevention device is installed on the recycled water service(s), as close to the meter(s) as possible, where chemical injection on the onsite recycled water system will be used.
- 14) Signs indicating recycled water use on the site are shown at all entrances to the site.
- 15) The recycled water system is completely separate and operates independently from any potable water system.
- 16) Hose bibbs are not on the recycled water systems. Approved quick coupling valves are ok.
- 17) Overspray and runoff of recycled water is minimized or eliminated.
- 18) Maintain separation between recycled and potable pipelines to the required minimum distances of 10 feet horizontally and 1 foot vertically. Sleeving shall be installed when minimum separation cannot be maintained.
- 19) Recycled and potable pipelines are not installed in the same trench.
- 20) Recycled water is not used for any other purpose except for the approved use.
- 21) Looped meters do not exist.
- 22) Minimum cover (depth of finished grade to top of recycled water pipe) is 18 inches, for all recycled water irrigation constant pressure pipes. Irrigation laterals with intermittent pressure shall have 12 inches minimum cover.

21.0 Field Testing Responsibilities

Field testing consists of three tests. These include the initial shutdown test, the coverage test and the cross connection control test. The initial shutdown testing shall be performed during the design phase by the site maintenance personnel with oversight from the Los Angeles County Department of Public Health for all sites within the County of Los Angeles, which is discussed in Section 17.0 of this Plan.

The coverage test is run by the contractor with the assistance of maintenance personnel to observe the distance of irrigation spray and to adjust sprinklers so that they do not cause excessive runoff, ponding or otherwise irrigate areas that are not intended. The contractor shall conduct pressure and coverage tests when wind conditions are such that water will not be windblown. Recycled water overspray on to areas

not controlled by the owner is prohibited. The contractor shall perform a coverage test in the presence of the LAUSD inspection staff to confirm that excessive overspray does not occur. Any modifications in either the system equipment, or adjustment identified by the contractor or LAUSD during the coverage test shall be completed in accordance with the schedule and conditions determined by LAUSD at the time of the test.

The cross connection control test shall be performed by a certified cross connection control specialist before final inspection and acceptance of construction. **The contractor is responsible for scheduling the cross connection control test.**

Cross connection control testing can only be performed by a certified cross connection control specialist. The purpose of the cross connection control test is to verify that the system, after construction and prior to connection of the irrigation system to the recycled water point of connection, does not contain cross connections between the potable system and the future recycled water system. The test includes recording of potable water pressure over a 2 hour period, and then recording the irrigation water pressure over another 2 hours. This must be done for each potable service and each recycled water service on site. Any rise in pressure of either system indicates that a cross connection may exist. Gradual drops in pressure on the potable system during the testing period may be due to leaks in the system and do not indicate a cross connection.

LAUSD and the Site Supervisor shall have a cross-connection control test performed no less than once every four years. **The Site Supervisor will be responsible for scheduling the cross connection control tests every four years.** Prior to the cross connection control test, the certified cross connection control specialist and the Site Supervisor shall conduct a comprehensive cross connection control survey of the entire site. The onsite survey shall be performed in years where the cross-connection control test is not performed. The survey shall include but not be limited to

- Check locations of the meters for the recycled and potable water systems to determine if there is any indication of changes and/or modifications.
- Check the backflow prevention assemblies at the service connections for any visible defects.
- Check all recycled water system control valves inside the facilities to ensure that all valve seals are in place and undisturbed. Check all control valve door signs.

22.0 Guidelines for Final Inspection and Acceptance

Immediately before conversion of a site to recycled water, the potable water line to buildings on site shall be exposed for visual inspection. **Do not backfill open trenches prior to inspection and acceptance by the LACDPH.** If the potable lateral is under concrete or asphalt, only a cross connection shutdown test is required, and then annual visual inspection. The visual inspection will involve looking for patches in the concrete or asphalt.

When checking for cross connections during the final inspection, be aware of the recycled water and potable water system pressures. When the recycled water system is turned off, periodically check to ensure there is no flow.

The LACDPH representative will perform the final inspection and provide approval of the site once the final inspection is completed successfully.

23.0 As-built Drawings Protocol

After construction of the recycled water system is complete, LACDPH has approved the site for recycled water use and the site has been connected to the recycled water main, the project drawings shall be updated to as-built condition.

The project design Architect shall be responsible for taking field markups on the design drawings and updating the Mylar plans with the final condition as marked by the field engineer.

After the plans have been updated to as-built condition, one (1) electronic copy in PDF and AutoCAD format shall be provided on CD, and one (1) hard copy of the as-built plans on Mylar shall be provided to the LAUSD Recycled Water Project Manager for their records.

24.0 Construction Documents Guidelines

All construction documents shall be packaged and handed over to LAUSD according to the submittal requirements found in Sections 15.0 and as-built requirements found in Section 23.0 for distribution to the maintenance department according to the following guidelines.

All construction documents, including as-built plans and conformed specifications, shall be made into hard copy, with

- One (1) set of full sized plans on bond paper
- One (1) set of half sized plans hole-punched and unbound for copying purposes
- One (1) set of specifications hole-punched and unbound for copying purposes
- One (1) copy of the construction documents on CD/DVD in PDF format

All of these construction documents shall be furnished to the maintenance department at the end of construction by the LAUSD Recycled Water Program Manager. One set of full sized plans shall be stored in the school plant manager office so there is a complete plan on site at all times.

A table with submittal and contract document responsibilities during project completion is provided below.

Submittal	Refer to Sections	Responsibility	Recipient
Field Markups/Notes	23.0	Field Engineer	Design Architect
Final Mylars (as-built)	23.0	Design Architect	LAUSD
Construction Documents for Maintenance Department	24.0	LAUSD RW Program Manager	Maintenance Department

MAINTENANCE PHASE

This Chapter presents guidelines for the training of maintenance personnel, best management practices, annual site check lists and concludes with a discussion of future work on recycled water systems.

25.0 Maintenance Personnel Training

Staff training on the proper use of recycled water shall be performed for each person involved in the LAUSD recycled water program. The following information shall be used to develop material for Site Supervisor Training. The provided information shall be used as the minimum information required in the training material.

25.1 Title

Develop a title page with the title “Recycled Water Site Supervisor Training”

25.2 Overview

The training shall include, but not be limited to, the following sections.

- Introduction to Recycled Water
- Production Process of Recycled Water and RW Quality
- Rules and Regulations
- Introduction to Backflow Prevention and Cross Connections
- Recycled Water Site Supervisor Duties and Responsibilities
- Plants, Vegetation and Irrigation Practices

25.3 Introduction to Recycled Water

- Recycled water is highly treated municipal wastewater that can be used for non-potable applications such as agriculture and landscape irrigation.
- Commercial uses of recycled water include toilet/urinal flushing and landscape irrigation.
- Recycled water is also used in construction for dust control and other uses.
- Recycled water is beneficial since it provides a reliable and generally drought proof water supply.
- Recycled water conserves groundwater and surface water that would otherwise be used for non-potable irrigation use
- Recycled water aids in compliance with the Federal Clean Water Act by reducing discharge of treated sewage into rivers and oceans.
- Recycle water will generally be sold at a lower rate than potable water.
- Recycled water has a high nutrient content which benefits landscaping by reducing the need for chemical fertilizers.
- Required inspections ensure the irrigation systems are maintained in optimal working order.

25.4 Production Process of Recycled Water and RW Quality

- The purpose of a water recycling plant
- Characteristics of water
- Disinfection
- Sanitary Collection System
- Preliminary Treatment
- Primary Treatment

- Secondary Treatment
- Tertiary Treatment
- Recycled Water Quality Requirements
- Health Risks

25.5 Rules and Regulations

- Laws for Using Recycled Water
- CCR Titles 17 and 22

25.6 Introduction to Backflow Prevention and Cross Connections

- Shutdown Test Preparation
- Shutdown Test
- Pressure Test of Recycled System
- Pressure Test of Potable System
- Common Problems Encountered
- Dye Testing on Dual Plumbed Sites
- Total Dissolved Solids (TDS) Testing
- Problems with TDS Testing
- Visual Inspections
- Checking for Cross Connections

25.7 Recycled Water Site Supervisor Duties and Responsibilities

- Recycled Water Dos
 - Install and maintain signage at all points of entry (pedestrian and vehicular)
 - Install and maintain labels and tags on recycled and potable water systems
 - Operate irrigation system:
 - Between 9:00 pm – 4 am if automatically controlled
 - At other times if manually controlled and supervised (someone present)
 - Modify irrigation practice to suit type of vegetation and soil
 - Use quick couplers instead of hose bibbs
 - Contact “provider” if water system modifications are anticipated
 - Immediately contact utility or producer or LACDPH if any of the following has or is anticipated to occur:
 - A recycled water line break, spill or off-site discharge of recycled water
 - A violation of water recycling requirements
 - A cross-connection between the recycled and potable water systems
 - Educate site workers on safe use and restrictions of recycled water
 - Keep records and as-built drawings up-to-date and accessible
 - Assist during Annual Visual Inspections
 - Assist during Periodic Cross-Connection Testing
- Recycled Water Don'ts
 - Don't drink recycled water
 - Don't use recycled water to wash hands or any other part of body
 - Don't remove recycled water identification signs, tags or labels
 - Don't cross-connect two dissimilar water systems (recycled to potable)
 - Don't allow recycled water to contact drinking fountains or eating areas
 - Don't allow recycled water to pond/puddle
 - Don't allow recycled water to runoff the use site property by either overspray or over watering

-
- No hose bibbs on recycled water systems (unless public access is prohibited)
 - Don't use the same equipment on both recycled water and domestic water systems (for example, quick couplers, tools, etc.)
 - Don't perform system modifications without prior approval of provider/LACDPH
 - Working with Recycled Water
 - Routine and Annual Site Inspections
 - Duties of the Site Supervisor
 - Inspecting for Overspray and Runoff
 - Inspecting for Broken Heads
 - Checking Proper Signage
 - Checking Valve Boxes
 - Quick Coupler Quill with Hose Bibbs
 - Examples of Bad Irrigation
 - Irrigation During Day with Misting
 - Irrigation into Storm Drain
 - Watering during Public Contact
 - Water Blowing Beyond Landscaping
 - Ponding
 - Overspray due to Lack of Consideration of Landscaping and Irrigation Heads
 - Runoff
 - Potable Water Makeup Line with No Air Gap

25.8 Plants, Vegetation and Irrigation Practices

- Recycled Water Quality Requirements
- Salinity
- Tolerance of Various Crops
- Tolerance of Turfgrasses
- Guidelines for Recycled Water Use
- Problems Involving Turf
 - Plant damage resulting from salt-affected soils and saline waters
 - Plant damage resulting from specific ions
 - Plant damage resulting from water stress
 - Plant damage caused by Nutrient Deficiencies
 - Problems related to soil permeability, drainage and aeration deficit
 - Problems resulting from compaction of soil by vehicular and human traffic
 - Herbicide damage
 - Temperature related injuries
- Problems Involving Trees, Shrubs and Ground Covers
 - Plant damage resulting from salt-affected soils and saline waters
 - Plant damage resulting from specific ions
 - Plant damage resulting from water stress
 - Plant damage resulting from poor aeration and drainage
 - Plant damage caused by Nutrient Deficiencies
 - Plant damage related to air pollutants
 - Plant damage related to herbicides
 - Plant damage related to temperature
 - Plant damage related to sunlight
 - Wind damage
 - Problems resulting from construction activity or mechanical damage

- Guidelines for Recycled Water Irrigation Systems

25.9 Emergency Response Plan

In the event that a cross connection is detected or suspected during a cross connection control inspection or test, or at any other time a backflow incident occurs, the following procedures shall be implemented immediately.

1. Both recycled and potable water supplies must be shut down immediately.
2. The LAUSD and LADWP must be immediately advised.
3. Water samples from the drinking water supply shall be collected and submitted for bacteriological analysis.
4. The actual or suspected cross connection shall be investigated and eliminated.
5. A cross connection control test, following the procedures outlined in Section 17 of this document, shall be performed.
6. The potable water plumbing system shall be disinfected thoroughly utilizing a highly concentrated chlorine solution. The chlorine solution shall have a minimum residual chlorine concentration of 50 ppm and shall be maintained throughout the plumbing system for 24 hours.
7. The potable piping system shall be thoroughly flushed after the 24 hour holding period and additional drinking water analysis performed.
8. Reported “Negative” finding for bacteria and approval from the LACDPH shall be required prior to re-activation of both the recycled and potable water systems.

26.0 Tracking of Staff Training, Inspection and Testing

Staff training on the proper use of recycled water shall be performed for each person involved in the LAUSD recycled water program. The Site Supervisor Training outline in Section 25.0 of this document can be used for this purpose. A sample tracking form for staff training is included on the following page.

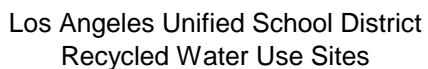
The CDPH requires inspection and testing of backflow prevention assemblies annually. Testing of backflow prevention assemblies shall be performed by a certified backflow prevention tester. The backflow prevention devices shall be repaired, overhauled and/or replaced whenever they are found to be defective. These devices shall also be tested immediately after they are installed, relocated or repaired. All inspections, tests and repairs shall be performed at LAUSD’s expense.

The CDPH requires a site shutdown for cross connection control test every four years. Cross connection control shall be performed by a Cross Connection Control Specialist. All inspections, tests and repairs shall be performed at LAUSD’s expense.

The LAUSD shall track the status of these tests and have a program in place to perform these tests as required. A sample tracking form that shall be kept on file for each site is included on the following page. LAUSD shall maintain records of all tests, repairs and overhauls. Records shall be submitted to the LADWP annually and made available to the CDPH on request.

27.0 Best Management Practices Guidelines

The LAUSD has prepared the Post-Construction Recycled Water BMP for control of recycled water at its facilities. It should be known that any planning and design of recycled water facilities must conform to



LAUSD uses this checklist to track the training of staff. All LAUSD staff planning, designing or maintaining recycled water systems are required to attend the Recycled Water Site Supervisor Training.

[illegible]



Los Angeles Unified School District
Recycled Water Use Sites

Site Name _____
Date _____

Checklist #5 - Inspection and Test Tracking

LAUSD uses this checklist to track the inspection and testing of backflow prevention devices on the site as well as the cross connection control tests of the recycled water system. The CDPH requires inspection and testing of backflow prevention assemblies annually. Testing of backflow prevention assemblies shall be performed by a certified backflow prevention tester. The backflow prevention devices shall be repaired, overhauled and/or replaced whenever they are found to be defective. These devices shall also be tested immediately after they are installed, relocated or repaired. The CDPH requires a site shutdown for cross connection control test every four years. Cross connection control shall be performed by a Cross Connection Control Specialist.

Backflow Preventers

Comments

Backflow Preventer Serial Date Test Performed

- 1) _____
2) _____
3) _____

Backflow Tests Performed By / Backflow Cert Number

All Backflows Passed? Yes No

List Approved Repairs/Modifications to BP Assemblies:

Cross Connection Control Test

Comments

Cross Connection Control Test - Last Date Performed

Cross Connection Control Test Performed By / Cert Number

Cross Connection Control Test Passed? Yes No

List Approved Repairs/Modifications:

LAUSD standards and that the following provisions do not supersede any of the LAUSD planning and design requirements.

There are several items to consider when selecting BMPs to implement.

- Soil type will affect the ability for the recycled water to infiltrate
- Minimizing runoff when the application rate exceeds the infiltration rate
- Proximity of streams, storm channels or storm drains as recycled water is prohibited from entering these systems
- Surrounding environment and landscape
 - Low points can create ponding
 - Landscape and separation issues
 - Buildings
- Impact to eating areas
- Drinking fountains
- Kinder play areas
- LAUSD criteria
- Maintenance requirements

27.1 Efficient Irrigation

The following are common practices that are applicable to all types of landscape irrigation systems. These practices result in a highly efficient and uniform irrigation regime. Runoff, over spray, ponding and other issues are greatly reduced to minimal levels.

However, no matter how well designed, constructed and maintained, it should be known that irrigation systems can not apply water at 100% uniformity. There will always be areas within any given irrigation site that receive more or less than the optimum amount of water. Disproportionate amounts of water can be minimized to be insignificant, and often times to undetectable amounts, in an efficiently run irrigation system. The efficiency of a properly designed and constructed irrigation system is dependent on three components: hardware; maintenance; and management.

27.1.1 Hardware

Irrigation systems must be properly equipped with appropriate hardware for the application. This is usually the most difficult and costly of the three components for an efficient irrigation system. Nonetheless, proper hardware is essential.

- 1) Install irrigation system according to the design and approved plans.
- 2) Verify that all sprinkler heads are uniform in brand, model and nozzle size. Different sized sprinkler heads, models or brands will have different application rates. Where different spray patterns are needed on the same station, match precipitation rates.
- 3) Measure the spacing between sprinkler heads. Position heads per the manufacturer's recommendations.
- 4) Where lower precipitation rates are required, such as on slopes or heavy textured soils, reduced nozzle size and spray angle per manufacturer's recommendations.
- 5) Install booster pumps to increase pressures where needed, with a low flow/low pressure cut off switch.
- 6) Install pressure regulators to reduce pressures where needed. These are often used on steep slopes where main lines run downhill.

- 7) Make sure pipes are sized to transmit/distribute water in the quantity demanded by the systems.
- 8) Use check valves either in-line or built into the sprinkler head assembly to virtually eliminate low head drainage after the valve has closed. These devices substantially reduce runoff and ponding from individual sprinkler heads.
- 9) Use automatic flow control devices that shut down a system if a break or other similar high flow/low pressure situation develops during irrigation. These devices can save significant amounts of water and virtually eliminate runoff and ponding should a break occur.
- 10) The use of centralized control systems or controllers that measure or can be programmed to use evaporation rates or systems that use controls such as moisture sensors is recommended.
- 11) Use automatic rain shut-off devices to reduce irrigation if significant rainfall occurs. Use multiple rain shut-off devices to reduce ponding if precipitation rate is higher than infiltration rate of the soil.

27.1.2 Maintenance and Management

Often the most overlooked and easiest component to perform, poor maintenance is usually the cause of many problems associated with non-uniform irrigation. The following practices are performed routinely or as soon as possible to remedy a problem situation. When recycled water is used, these practices are intensified to comply with local regulations.

- 1) Adjust sprinkler heads so that they achieve 80% head to head coverage throughout their intended arc. There should be no obstruction or hindrance that would interfere with the free rotation and smooth operation of any sprinkler, such as tall grass, shrubs, trees, signs, etc. The system should be routinely tested during the daytime when workers are present so adjustments can be made.
- 2) Adjust valves or pressure regulators so that the systems are operating at the pressure required by the sprinkler heads or emitters. Test pressures seasonally or as needed with a pressure gauge and maintain levels required by the sprinklers and/or emitters.
- 3) Routinely test accuracy of time clocks with a stopwatch. This is also a time to check if valves are opening and closing properly. Repair broken or faulty valves and have time clock calibrated/repared if not functioning properly.
- 4) Repair or replace broken risers, sprinklers, valves, etc. as soon as they are discovered. When replacing equipment such as sprinklers and emitters, use correct manufacturer and model number so that system uniformity is maintained.
- 5) Routinely check backflow prevention devices, pumps and other appurtenances for leaks and other conditions that might impact the irrigation system. Repair or replace as needed.
- 6) Routinely clean screens and backwash filters to keep systems operating optimally.
- 7) Routinely check micro-irrigation systems for clogged, broken or faulty emitters. Repair or replace as needed. Clogged emitters cause non-uniform irrigation that result in over and under watering conditions. Plant material suffers (aesthetics and/or yields decrease) and water bills can actually rise.

28.0 Annual Site Check List

The Site Supervisor is responsible for the routine annual inspection and this inspection shall be performed with a representative from LADWP. The inspection shall include, but not be limited to, the following.

1. Inspection of overspray and runoff
2. Inspection of broken irrigation heads

3. Check for proper signage
4. Check valve boxes for proper marking and tagging
5. Verify that only quick couplers are on recycled water and no hose bibs are connected to recycled water
6. Verify that sprinklers do no mist
7. Verify that irrigation does not drain into storm drains
8. Verify that the irrigation controllers operate only during approved times for irrigation
9. Verify that ponding is not apparent
10. Verify that approved separation between recycled water irrigated areas and potable water irrigated areas exists as appropriate
11. Record plant growth and take pictures of plants for records
12. Keep records of water usage to verify water savings
13. Record any observable effects of recycled water on plants
14. Record maintenance schedules to track changes

29.0 Future Work on Recycled Water System

As noted in the General Notes that shall be included in design plans per Section 15.3.12, upon final acceptance of an irrigation system, any future modifications of the site's recycled water system must be approved through LAUSD, LADWP and the LACDPH prior to the start of construction.

Any modifications will have to conform to the guidelines for retrofit of existing systems found in Section 12.6.

APPENDIX A

Los Angeles Unified School District Maintenance and Operations 12 Approved Plant List Review for Compatibility with Recycled Water Use

LOS ANGELES UNIFIED SCHOOL DISTRICT MAINTENANCE AND OPERATIONS 12 APPROVED PLANT LIST REVIEW FOR COMPATIBILITY WITH RECYCLED WATER USE

JANUARY 2011

Parkins and Associates
For AECOM Technical Services, Inc



Executive Summary

The following list represents the current selection of plants approved by the Los Angeles Unified School (LAUSD) District 12. The plants listed have been reviewed for compatibility for use with a recycled water source. There are many approaches that could be implemented for this type of undertaking. Since there was a list that is currently being utilized, the plants on this list were compared to several reference standards that are referenced at the end of this document.

The LAUSD list references the plants using the common binomial system which incorporates the genus and species assignments of the plant. The plant choices also list variants and cultivars to further distinguish plants. The comparisons were completed using the specific species listed and not for the more general genus assessment. Research in the field of salinity and specifically recycled water use, tends to classify plants by genus and species tolerance for broad listings. For this reason, many of the plants on this list are “not rated” because the specific cultivar or variant could not be located on the documents being considered.

The terminology utilized for communicating compatibility is as follows:

Categories:

Salinity Tolerance
Recommended for Planting
Boron Tolerance
Comments

Category Range:

Salinity Tolerance:

HIGH:	Permissible soil EC_e greater than 4 and less than 6 dSm^{-1}
MODERATE:	Permissible soil EC_e greater than 2 but less than 4 dSm^{-1}
LOW:	Permissible soil EC_e less than 2 dSm^{-1}
NOT RATED:	this specific plant was not evaluated by the resources being utilized, and, therefore, not rated

Recommended for Planting:

RECOMMENDED: Plants listed as “recommended” were evaluated as well suited for the five zones as outlined by Trees and Shrubs for Dry California Landscapes, (Perry, 1981). The five zones are as follows:

1. Coastal Margin
2. Intermediate Valleys
3. Inland Valleys
4. Coastal Foothills
5. Inland Foothills

NOT

RECOMMENDED: The choice from the list of accepted LAUSD plants was not located on this resource.

Boron Tolerance:

Two sources were referenced in categorizing boron tolerance for the selected plants. Boron toxicity represents a hazard to the health of the plant and is another parameter used to further refine the suitability of a particular plant for recycled water use. The ranges were as follows:

HIGH:	2.0-10.0 parts per million (ppm)
MODERATE:	1.0-2.0 ppm
LOW:	0.0-1.0
NOT RATED:	The choice from the list of accepted LAUSD plants was not located on these resources.

Plant Vigor

The elevated levels of sodium, chloride, boron, and bicarbonate found in reclaimed water, all present challenges for management of susceptible plant material. The plants listed as moderate or high on the salinity and boron columns represent the best chances for producing acceptable quality of plants in this environment. Those plants listed as low in both columns are negatively influenced by elevated salt levels. Exceeding threshold tolerance levels of the individual plant species with sensitive plants interferes with root and shoot development by decreasing water uptake by the plant and increasing toxic ions within plant structures. Frequently, these plants are also affected by a decreasing growing media permeability or movement of water and oxygen into the profile. Water uptake is diminished in media with high salts due to the decreased ability of the plant roots to "pull" water out of the soil. Specific ion toxicities within the plant are caused primarily by excess chloride, sodium, boron, and bicarbonate ions. Elevated levels of sodium and excess insoluble bicarbonate precipitates cause diminished permeability and increases in sodium ions on the soil surface. This directly impacts water infiltration and percolation rates, and, therefore, availability of water to the plant. This can be problematic even with plants that are tolerant of high salinity at the root interface. Surface sealing will also lead to low oxygen diffusion and slow carbon dioxide release out of the soil. Anaerobic conditions predominate in this environment causing diminished root development.

PLANT	SALINITY TOLERANCE	RECOMMENDED FOR PLANTING	BORON TOLERANCE	COMMENTS
EVERGREEN CANOPY SHADE TREE				
BOTANICAL NAME / COMMON NAME				
• ARBUTUS UNEDO STRAWBERRY TREE	HIGH	RECOMMENDED	HIGH	
CASSIA EXCELSA CROWN OF GOLD TREE [Cassia spp. (senna)]	HIGH	ALL BUT COASTAL	HIGH	
CASSIA LEPOPHYLLA GOLD MEDALLION [Cassia spp. (senna)]	HIGH	ALL BUT COASTAL	HIGH	
CERATONIA SILIQUA (MALE ONLY) CAROB TREE	MODERATE	RECOMMENDED	MODERATE	
CINNAMOMUM CAMPHORA CAMPHOR TREE	MODERATE	NOT RECOMMENDED	NOT RATED	
CUPANIOPIS ANACARDIODES CARROT WOOD	HIGH	NOT RECOMMENDED	NOT RATED	
ERIOBOTRYA DEFLEXA BRONZE LOQUAT	MODERATE	RECOMMENDED	MODERATE	Eriobotrya japonica Lindl. Moderate
FICUS BENJAMINA WEEPING CHINESE	MODERATE	NOT RECOMMENDED	NOT RATED	
BANYAN	NOT RATED	NOT RECOMMENDED	NOT RATED	
FRAXINUS UHDEI EVERGREEN ASH	NOT RATED	NOT RECOMMENDED	NOT RATED	(F. pennsylvanica var. lanceolata, velutina var. glabra 'Modesto' both high)
HARPEPHYLLUM CAFFRUM KAFFIR PLUM	NOT RATED	NOT RECOMMENDED	NOT RATED	
MAGNOLIA GRANDIFLORA SOUTHERN MAGNOLIA	UNDETERMINED	NOT RECOMMENDED	LOW	
MAGNOLIA GRANDIFLORA 'MAJESTIC BEAUTY' MAJESTIC BEAUTY	NOT RATED	NOT RECOMMENDED	LOW	
MAGNOLIA (SPP.)	UNDETERMINED	NOT RECOMMENDED	LOW	

MAYTENUS BOARIA MAYTEN TREE	NOT RATED	NOT RECOMMENDED	HIGH	M. phyllanthoides tolerant
METROSIDEROS EXCELSUS NEW ZEALAND CHRISTMAS TREE	HIGH	ALL BUT INLAND FOOTHILLS	NOT RATED	
.. • OLEA EUROPAEA 'FRUITLESS' OLIVE ONLY	UNDETERMINED	RECOMMENDED	HIGH	
• PINUS PINEA ITALIAN STONE PINE	HIGH	RECOMMENDED	MODERATE	
PYRUS KAWAKAMII EVERGREEN PEAR	HIGH	NOT RECOMMENDED	HIGH	
• QUERCUS AGRIFOLIA COAST LIVE OAK	HIGH	RECOMMENDED	HIGH	NATIVE
• QUERCUS CHRYSOLEPIS CANYON LIVE OAK	NOT RATED	Recommended for all but coastal margin	NOT RATED	
• QUERCUS DOUGLASII BLUE OAK	NOT RATED	Recommended for all but coastal margin and intermediate valleys	NOT RATED	
• QUERCUS ENGELMANNII MESA OAK	NOT RATED	Recommended, best in coastal foothills and inland valleys	NOT RATED	NATIVE
• QUERCUS WISLIZENII INTERIOR LIVE OAK	NOT RATED	RECOMMENDED	NOT RATED	
SCHINUS TEREBINTHEFOLIUS BRAZILIAN PEPPER	HIGH	RECOMMENDED	HIGH	
TIPUANA TIPU TIPU TREE	NOT RATED	NOT RECOMMENDED	NOT RATED	
ULMUS PARVIFOLIA EVERGREEN ELM	MODERATE	NOT RECOMMENDED	LOW	
EVERGREEN INFORMAL UPRIGHT				
BOTANICAL NAME / COMMON NAME				
• BRACHYCHITON POPULEUM BOTTLE TREE	NOT RATED	NOT RECOMMENDED	NOT RATED	
HYMENOSPORUM FALVUM SWEETSHADE	NOT RATED	NOT RECOMMENDED	HIGH	
• LAURUS NOBILIS SWEET BAY	NOT RATED	RECOMMENDED	HIGH	

• LYONOTHAMNUS FLORIBUNDUS CATALINA IRONWOOD	NOT RATED	RECOMMENDED, BEST COASTAL	NOT RATED	NATIVE
• LYSILOMA MICROPHYLLA VAR. THORNBURI FEATHER BUSH	NOT RATED	NOT RECOMMENDED	NOT RATED	
• MELALEUCA LINARIIFOLIA FLAXLEAF PAPERBARK	NOT RATED	RECOMMENDED	NOT RATED	
• MELALEUCA NESOPHILA PINK MELALEUCA	HIGH	NOT RECOMMENDED	NOT RATED	
MELALEUCA QUINQUENERVIA CAJEPUT TREE	MODERATE	RECOMMENDED	NOT RATED	
• PINUS COULTERI COULTER PINE	NOT RATED	Listed without recommendations	NOT RATED	
• PINUS EDULIS PINYON PINE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• PITTOSPORUM UNDULATUM VICTORIAN BOX	NOT RATED	RECOMMENDED	LOW	P. tobra Alton highly tolerant
STENOCARPUS SINUATUS FIREWHEEL TREE	NOT RATED	NOT RECOMMENDED	NOT RATED	
TRISTANIA CONFERTA BRISBANE BOX	NOT RATED	RECOMMENDED	NOT RATED	
EVERGREEN SCREENS TREES				
BOTANICAL NAME / COMMON NAME				
• ARBUTUS UNEDO 'COMPACTA' DWARF STRAWBERRY TREE	LOW	RECOMMENDED	HIGH	
CUPRESSOCYPARIS LEYLANDII LEYLAND CYPRESS	HIGH	RECOMMENDED	NOT RATED	
• CUPRESSUS ARIZONICA VAR. GLABBA ARIZONA CYPRESS SMOOTH	NOT RATED	NOT RECOMMENDED	NOT RATED	Cupressus spp. Recommended
ARIZONA CYPRESS	NOT RATED	NOT RECOMMENDED	NOT RATED	
• CUPRESSUS FORBESII TECATE CYPRESS	LOW	NOT RECOMMENDED	NOT RATED	
• CUPRESSUS SEMPERVIRENS ITALIAN CYPRESS	HIGH	NOT RECOMMENDED	HIGH	

FICUS MICROCARPA NITIDA 'GREEN GEM' GREEN GEM INDIAN	NOT RATED	NOT RECOMMENDED	NOT RATED	F. microcarpa high
LAUREL	NOT RATED	NOT RECOMMENDED	NOT RATED	
• JUNIPERUS CHINENSIS 'TORULOSA' HOLLYWOOD JUNIPER	MODERATE	RECOMMENDED	HIGH	
PINUS THUNBERGIANA 'MAJESTIC BEAUTY' JAPANESE BLACK PINE	MODERATE - HIGH	NOT RECOMMENDED	MODERATE	
PRUNUS CAROLINIANA CAROLINA LAUREL CHERRY	UNDETERMINED	RECOMMENDED	HIGH	
PITTOSPORUM EUGENOIDES TARATA	NOT RATED	NOT RECOMMENDED	NOT RATED	P. crassifolium, P. phillyraeoides, P. tobira moderate
PODOCARPUS GRACILIOR FERN PINE	NOT RATED	NOT RECOMMENDED	HIGH	
PODOCARPUS MACHROPHYLLUS YEW PINE	LOW	NOT RECOMMENDED	MODERATE	
PODOCARPUS HENKEI LONGLEAFED YELLOW WOOD	NOT RATED	NOT RECOMMENDED	NOT RATED	
• UMBELLULARIA CALIFORNICA CALIFORNIA BAY LAUREL	NOT RATED	NOT RECOMMENDED	NOT RATED	
EVERGREEN WEEPING FORM				
BOTANICAL NAME / COMMON NAME				
• ACACIA STENOPHYLLA SHOESTRING ACACIA	VERY HIGH	NOT RECOMMENDED	HIGH	
• AGONIS FLEXUOSA PEPPERMINT TREE	NOT RATED	RECOMMENDED	NOT RATED	
• ALLOCASUARINA VERTICILLATA (CASUARINA STRICTA) COAST BEEFWOOD	NOT RATED	NOT RECOMMENDED	NOT RATED	
.. • CALLISTEMON VIMINALIS WEEPING BOTTLE BRUSH	HIGH	RECOMMENDED	HIGH	
.. • GEIJERA PARVIFLORA AUSTRALIAN WILLOW	NOT RATED	RECOMMENDED	NOT RATED	
LEPTOSPERUM LAEVIGATUM AUSTRALIAN TEA TREE	LOW	RECOMMENDED	NOT RATED	

• PITTOSPORUM PHILLYRAEOIDES WILLOW PITTOSPORUM	NOT RATED	RECOMMENDED	NOT RATED
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EVERGREEN PYRAMID

BOTANICAL NAME / COMMON NAME			
CALOCEDRUS DECURRENS INCENSE CEDAR	NOT RATED	NOT RECOMMENDED	NOT RATED
• CASUARINA CUNNINGHAMIANA RIVER SHE-OAK	VERY HIGH	RECOMMENDED	NOT RATED
• CEDRUS ATLANTICA 'GLAUCA' BLUE ATLAS CEDAR	NOT RATED	RECOMMENDED	HIGH
.. • CEDRUS DEODARA DEODAR CEDAR	HIGH	RECOMMENDED	HIGH
• CEDRUS LIBANI CEDAR OF LEBANON	NOT RATED	NOT RECOMMENDED	NOT RATED
.. • PINUS CANARIENSIS CANARY ISLAND PINE	NOT RATED	RECOMMENDED	HIGH
.. • PINUS ELDARICA AFGHAN PINE	HIGH	NOT RECOMMENDED	NOT RATED
PINUS HALEPENSIS ALEPPO PINE	UNDETERMINED	RECOMMENDED	MODERATE
• PINUS MONTEZUMAE MONTEZUMA PINE	NOT RATED	NOT RECOMMENDED	NOT RATED
PALMS			
BOTANICAL NAME / COMMON NAME			
• ARCHONTOPHOENIX CUNNINGHAMIANA KING PALM	NOT RATED	NOT RECOMMENDED	NOT RATED
• SYAGRUS ROMANZOFFIANA QUEEN PALM	MODERATE	NOT RECOMMENDED	NOT RATED
• BRAHEA ARMATA BLUE HESPERPALM	HIGH	NOT RECOMMENDED	NOT RATED
• BRAHEA EDULIS GUADALUPE PALM	NOT RATED	NOT RECOMMENDED	NOT RATED

CHAMAEROP HUMILIS MEDITERRANEAN FAN	HIGH	NOT RECOMMENDED	NOT RATED	
CYCAS REVOLUTA SAGO PALM	MODERATE	NOT RECOMMENDED	NOT RATED	
TRACHYCARPUS FORTUNEI WINDMILL PALM	MODERATE	NOT RECOMMENDED	NOT RATED	
• WASHINGTONIA FILIFERA CALIFORNIA FAN PALM	HIGH	NOT RECOMMENDED	NOT RATED	
DECIDIOUS CANOPY SHADE TREES				
BOTANICAL NAME / COMMON NAME				
ACER SACCHARINUM SILVER MAPLE	LOW	NOT RECOMMENDED	LOW	
ALBIZZIA JULIBRISSIN SILK TREE	LOW	NOT RECOMMENDED	NOT RATED	
FRAXINUS OXYCARPA 'RAYWOOD' RAYWOOD ASH	MODERATE	NOT RECOMMENDED	HIGH	
GLEDTISIA TRIACANTHOS INERMIS HONEY LOCUST (THORNLESS)	MODERATE	NOT RECOMMENDED	LOW	
KOELREUTERIA BIPINNATA CHINESE FLAME TREE	NOT RATED	NOT RECOMMENDED	NOT RATED	
KOELREUTERIA PANICULATA GOLDENRAIN TREE	MODERATE	Recommended for all but coastal foothills	NOT RATED	
MORUS ALBA FRUITLESS MULBERRY	MODERATE	NOT RECOMMENDED	LOW	
PISTACIA CHINENSIS CHINESE PISTACHE	UNDETERMINED	Recommended for all but coastal margin	LOW	Recent rating is low
QUERCUS LOBATA VALLEY OAK	NOT RATED	Recommended for all but coastal margin and coastal foothills	HIGH	NATIVE
SOPHORA JAPONICA PAGODA TREE	MODERATE	NOT RECOMMENDED	MODERATE	
• ZELKOVA SERRATA SAWLEAF ZELKOVA	NOT RATED	RECOMMENDED	MODERATE	

DECIDIOUS UPRIGHT

BOTANICAL NAME / COMMON NAME			
GINKO BILOBA (MALE ONLY) MAIDENHAIR TREE	UNDETERMINED	NOT RECOMMENDED	NOT RATED
LIQUIDAMBAR STYRACIFLUA HYBRIDS 'PALO ALTO' SWEET GUM	UNDETERMINED	NOT RECOMMENDED	LOW-MODERATE
PYRUS CALLERYANA 'ARISTOCRAT' ORNAMENTAL PEAR	NOT RATED	NOT RECOMMENDED	NOT RATED
PYRUS CALLERYANA 'CHANTICLEER' ORNAMENTAL PEAR	NOT RATED	NOT RECOMMENDED	NOT RATED

DECIDIOUS FLOWERING TREE

BOTANICAL NAME / COMMON NAME			
BAUHINIA BLAKEANA HONG KONG ORCHID TREE	MODERATE	NOT RECOMMENDED	NOT RATED
BAUHINIA VARIEGATA (PURPUREA) PURPLE ORCHID TREE	MODERATE	NOT RECOMMENDED	LOW
CALODENDRUM CAPENSE CAPE CHESTNUT	NOT RATED	NOT RECOMMENDED	HIGH
• CERCIS OCCIDENTALIS WESTERN REDBUD	MODERATE	RECOMMENDED	LOW NATIVE
• CHILOPSIS LINEARIS DESSERT WILLOW	MODERATE	NOT RECOMMENDED	NOT RATED
.. • CHITALPA TASHKENENSIS CHITALPA	NOT RATED	NOT RECOMMENDED	NOT RATED
CHIONANTHUS RETUSUS CHINESE FRINGE TREE	NOT RATED	NOT RECOMMENDED	NOT RATED C. virginicus high
• FRAXINUS DIPETALA FOOTHILL ASH	NOT RATED	NOT RECOMMENDED	NOT RATED
JACARANDA MIMOSIFOLIA JACARANDA (LAWN ONLY)	MODERATE	NOT RECOMMENDED	HIGH
LAGERSTROEMIA INDICA CRAPE MYRTLE	NOT RATED	Recommended for all but coastal margin and coastal foothills	MODERATE
LAGERSTROEMIA INDICA HYBRIDS 'MUSKOGEE' CRAPE MYRTLE	NOT RATED	Recommended for all but coastal margin and coastal foothills	MODERATE

MAGNOLIA SOULANGIANA SAUCER MAGNOLIA	MODERATE	NOT RECOMMENDED	LOW	
MAGNOLIA STELLATA STAR MAGNOLIA	NOT RATED	NOT RECOMMENDED	LOW	
PRUNUS CERASIFERA 'ATROPURPUREA' PURPLE LEAF PLUM	NOT RATED	RECOMMENDED	HIGH	spp. Moderate
PYRUS CALLERYANA FLOWERING PEAR	NOT RATED	NOT RECOMMENDED	NOT RATED	
ROBINIA 'PURPLE ROBE' PURPLE ROBE LOCUST	NOT RATED	NOT RECOMMENDED	NOT RATED	R. pseudoacacia high
TABEBUIA CHRYSOTRICHIA GOLDEN TRUMPET TREE	NOT RATED	NOT RECOMMENDED	NOT RATED	
TABEBUIA IPE PINK TRUMPET TREE	MODERATE	NOT RECOMMENDED	NOT RATED	spp. Moderate
HERBACIOUS PERENNIALS SHRUBS				
BOTANICAL NAME / COMMON NAME				
ACANTHUS MOLLIS BEARS BREECH (SHADE ONLY)	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ACHILLEA MILLEFOLIUM & HYBRIDS COMMON YARROW	NOT RATED	RECOMMENDED	NOT RATED	
AGAPANTHUS /VARIETIES LILY OF THE NILE	MODERATE	NOT RECOMMENDED	NOT RATED	
• ALOYSIA TRIPHYLLA LEMON VERBENA	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ANIGOZANTHOS FLAVIDUS KANGAROO PAW	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ARTEMISIA CALIFORNICA CALIFORNIA SAGEBRUSH	NOT RATED	RECOMMENDED	NOT RATED	A. frigida, A. pycnocephala, A. spinescens, A. tridentata moderate-high; Native
• ASTER CHILENSIS 'POINT SAINT GEORGE' POINT SAINT GEORGE ASTER	NOT RATED	NOT RECOMMENDED	NOT RATED	
• BULBINE FRUTESCENS STALKED BULBINE	NOT RATED	NOT RECOMMENDED	NOT RATED	

• CLIVIA MINIATA KAFFIR LILY (SHADE ONLY)	NOT RATED	NOT RECOMMENDED	NOT RATED	
• CONVULVULUS CNEORUM BUSH MORNING GLORY	NOT RATED	RECOMMENDED	NOT RATED	
• COREOPSIS AURICULATA 'NANA' DWARF COREOPSIS	NOT RATED	NOT RECOMMENDED	NOT RATED	
• COREOPSIS GIGANTEA GIANT COREOPSIS	NOT RATED	NOT RECOMMENDED	NOT RATED	
• COREOPSIS LANCEOLATA COREOPSIS	NOT RATED	NOT RECOMMENDED	NOT RATED	
• COREOPSIS VERTICILATA CVS. THREADLEAF COREOPSIS	NOT RATED	NOT RECOMMENDED	NOT RATED	
DIETES (<i>IRIODES</i>) VEGETA FORTNIGHT LILY	HIGH	NOT RECOMMENDED	NOT RATED	
• ENCELIA CALIFORNICA ENCELIA	NOT RATED	Recommended for all but inland foothills	NOT RATED	E.farinose high; Native
• EPILOBIUM CANUM SPP. CANUM CALIFORNIA FUCHSIA	NOT RATED	NOT RECOMMENDED	NOT RATED	
• EREMOPHILA MACULATA SPOTTED EMU BUSH	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ERIGERON (ALL) SEASIDE DAISY	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ERIOPHYLLUM CONFERTIFLORUM GOLDEN YARROW	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• ESCHSCHOLZIA CALIFORNICA (RESEEDS ITSELF) CALIFORNIA POPPY	NOT RATED	NOT RECOMMENDED	MODERATE	
HEMEROCALLIS HYBRIDS DAY LILY	MODERATE	NOT RECOMMENDED	NOT RATED	
• IRIS DOUGLASIANA DOUGLAS IRIS	NOT RATED	NOT RECOMMENDED	NOT RATED	I. hexagona moderate
• JUSTICIA CALIFORNICA CHUPAROSA	NOT RATED	NOT RECOMMENDED	NOT RATED	J. brandegeana low
• JUSTICIA SPICIGERA MEXICAN HONEYSUCKLE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• KNIPHOFIA UVARIA RED HOT POKER	NOT RATED	NOT RECOMMENDED	NOT RATED	

LAVANDULA/VARIETIES LAVENDER	NOT RATED	RECOMMENDED	NOT RATED	
• LOBELIA LAXIFLORA MEXICAN BUSH LOBELIA	NOT RATED	NOT RECOMMENDED	NOT RATED	
• LOTUS SCOPARIUS DEER WEED	NOT RATED	RECOMMENDED	NOT RATED	
• MIMULUS AURANTIACUS MONKEY FLOWER	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• MONARDELLA VILLOSA COYOTE MINT	NOT RATED	NOT RECOMMENDED	NOT RATED	
• PELARGONIUM / VARIETIES GERANIUM	UNDETERMINED	NOT RECOMMENDED	LOW- MODERATE	
• PENSTEMON WILD SPP. PENSTEMON (WILD)	HIGH	RECOMMENDED	NOT RATED	NATIVE
• PHORMIUM SPP. NEW ZEALAND FLAX	MODERATE	NOT RECOMMENDED	NOT RATED	
• ROMNEYA COULTERI MATILIJIA POPPY	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• ROSEMARINUS 'PROSTRATUS' TRAILING ROSEMARY	HIGH	NOT RECOMMENDED	UNDETERMI NED	
• SISYRINCHIUM BELLUM BLUE- EYED GRASS	NOT RATED	NOT RECOMMENDED	NOT RATED	
• SPHAERALCEA AMBIGUA DESERT MALLOW	NOT RATED	NOT RECOMMENDED	NOT RATED	
STRELIZIA REGINAE BIRD OF PARADISE	MODERATE	NOT RECOMMENDED	MODERATE	
• TEUCRIUM FRUTICANS BUSH GERMANDER	NOT RATED	NOT RECOMMENDED	NOT RATED	
• TEUCRIUM MARUM CAT THYME	NOT RATED	NOT RECOMMENDED	NOT RATED	
• THALICTRUM FENDLERI VAR. POLYCARPUM MEADOW RUE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• TRICHOSTEMA LANATUM WOOLLY/MOUNTAIN 'Blue Curls'	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
TULBAGHIA VIOLACEA 'VARIGATA' SOCIETY GARLIC	MODERATE	NOT RECOMMENDED	NOT RATED	

• VERBASCUM PHOENICEUM PURPLE MULLEIN	NOT RATED	NOT RECOMMENDED	NOT RATED
• VERBENA LILACINA LILAC VERBENA	LOW	NOT RECOMMENDED	NOT RATED

SUN SHRUBS

BOTANICAL NAME / COMMON NAME				
• ABUTILON PALMERI INDIAN MALLOW	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ADENOSTOMA FASCICULATUM CHAMISE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ALYOGNE HUEGELII BLUE HIBISCUS	NOT RATED	NOT RECOMMENDED	NOT RATED	
AZALEA SOUTHERN INDICA SUN AZALEAS	NOT RATED	NOT RECOMMENDED	NOT RATED	
• BACCHARIS "CENTENNIAL" CENTENNIAL BACCHARIS	HIGH	NOT RECOMMENDED	NOT RATED	
• BACCHARIS PILULARIS COYOTE BRUSH	HIGH	RECOMMENDED	HIGH	B. emory, glutinosa, halimifolia, philaris consanguinea, sarthroides, viminea all high - very high; Native
• CAESALPINEA GILLIESII DESERT BIRD OF PARADISE	HIGH	NOT RECOMMENDED	NOT RATED	
• CALLIANDRA CALIFORNICA BAJA FAIRY DUSTER	NOT RATED	Recommended for all but coastal margin and intermediate valleys	NOT RATED	NATIVE
• CALLIANDRA ERIOPHYLLA FAIRY DUSTER	NOT RATED	Recommended for all but coastal margin	NOT RATED	NATIVE
CAMELLIA SASANQUA SUN CAMELLIA	NOT RATED	NOT RECOMMENDED	NOT RATED	
CEANOTHUS/VARIETIES WILD LILAC	HIGH	RECOMMENDED	HIGH	NATIVE
• CERCOCARPUS BETULOIDES MOUNTAIN IRONWOOD (Mountain mahogany, Hardtack)	HIGH	Recommended for coastal foothills and inland foothills	NOT RATED	NATIVE
• CORDIA PARVIFOLIA LITTLE LEAF CORDIAL	MODERATE	NOT RECOMMENDED	NOT RATED	

• DALEA BICOLOR INDIGO BUSH	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ERIOGONUM FASCICULATUM BUCKWHEAT	HIGH	RECOMMENDED	NOT RATED	NATIVE
ESCALLONIA/VARIETIES ESCALLONIA	MODERATE	RECOMMENDED	NOT RATED	
EURYOPS PECTINATUS GOLDEN SHRUB DAISY	UNDETERMINED	NOT RECOMMENDED	NOT RATED	
• FALLUGIA PARADOXA APACHE PLUME	MODERATE	NOT RECOMMENDED	NOT RATED	
• FORESTIERA NEOMEXICANA DESERT OLIVE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• GALVESIA SPECIOSA ISLAND BUSH	NOT RATED	NOT RECOMMENDED	NOT RATED	
ANTIRRHINUM MAJUS (snapdragon)	NOT RATED	NOT RECOMMENDED	NOT RATED	
GREVILLEA NOELLII GREVILLA	NOT RATED	RECOMMENDED	NOT RATED	
HEBE/VARIETIES HEBE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ISOCOMA MENZIESII GOLDENBUSH	NOT RATED	NOT RECOMMENDED	NOT RATED	
• JUNIPERUS/VARIETIES JUNIPER	MODERATE	RECOMMENDED	UNDETERMINED	J. scopulorum var. Moffeti low
LANTANA/VARIETIES LANTANA	HIGH	RECOMMENDED	UNDETERMINED	
• LAVATERA ASSURGENTIFLORA TREE MALLOW	HIGH	RECOMMENDED	NOT RATED	NATIVE
• LEPTOSPERMUM/VARIETIES LEPTOSPERMUM	LOW	RECOMMENDED	NOT RATED	
LOROPETALUM CHINENSE FRINGE FLOWER	NOT RATED	NOT RECOMMENDED	NOT RATED	
MYRTUS/VARIETIES MYRTLE	HIGH	NOT RECOMMENDED	MODERATE	
NANDINA DOMESTICUS/VARIETIES HEAVENLY BAMBOO	LOW	NOT RECOMMENDED	NOT RATED	

OSMANTHUS FRAGRANS SWEET OLIVE	NOT RATED	NOT RECOMMENDED	NOT RATED	
PITTOSPORUM/VARIETIES PITTOSPORUM	NOT RATED	RECOMMENDED	UNDETERMI NED	
PLUMBAGO AURCULATA BLUE PLUMBAGO	HIGH	RECOMMENDED	NOT RATED	
• QUERCUS DURATA LEATHER OAK	NOT RATED	NOT RECOMMENDED	NOT RATED	
RHAPHIOLEPIS/VARIETIES INDIAN HAWTHORNE	HIGH	NOT RECOMMENDED	HIGH	
• RHUS OVATA SUGAR BUSH	HIGH	RECOMMENDED	NOT RATED	NATIVE
• ROSMARINUS/VARIETIES ROSEMARY	MODERATE	RECOMMENDED	UNDETERMI NED	
• SALVIA APIANA WHITE SAGE	HIGH	RECOMMENDED	NOT RATED	NATIVE
• SALVIA LEUCANTHA MEXICANA BUSH SAGE	NOT RATED	RECOMMENDED	NOT RATED	
• SALVIA LEUCOPHYLLA PURPLE SAGE	NOT RATED	Recommended for all but coastal margin	NOT RATED	NATIVE
• SALVIA MELLIFERA BLACK/GREEN SAGE	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• SALVIA 'MRS. BEARD' MRS. BEARD SAGE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• SALVIA MUNZII SAN MIGUEL MOUNTAIN	NOT RATED	NOT RECOMMENDED	NOT RATED	
• SIMMONDSIA CHINENSIS JOJOBA	HIGH	Recommended for all but coastal margin and coastal foothills	NOT RATED	NATIVE
• SALVIA "BEE'S BLISS" BEE'S BLISS SAGE	NOT RATED	NOT RECOMMENDED	NOT RATED	
SYRINGA/VARIETIES LILAC S. AMURENSIS	MODERATE	NOT RECOMMENDED	NOT RATED	
TRACHELOSPERMUM JASMINOIDES STAR JASMINE	HIGH	NOT RECOMMENDED	NOT RATED	
VIBURNUM/VARIETIES VIRBURNUM	LOW	NOT RECOMMENDED	UNDETERMI NED	

XYLOSMA CONGESTUM 'COMPACTA' XYLOSMA	MODERATE	RECOMMENDED	LOW- MODERATE
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SHADE SHRUBS

BOTANICAL NAME / COMMON NAME				
ACUBA JAPONICA JAPANESE ACUBA	NOT RATED	NOT RECOMMENDED	NOT RATED	
AZALEA BELGIUM HYBRIDS SHADE AZALEAS	NOT RATED	NOT RECOMMENDED	NOT RATED	
• CARPENTERIA CALIFORNICA BUSH ANEMONE	NOT RATED	NOT RECOMMENDED	NOT RATED	
CYRTOMIUM FALCATUM HOLLY FERN	NOT RATED	NOT RECOMMENDED	NOT RATED	
• DENDROMECON RIGIDA BUSH POPPY	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
FATSIA JAPONICA JAPANESE ARLIA	LOW	NOT RECOMMENDED	NOT RATED	
• GALVEZIA SPECIOSA ISLAND BUSH	NOT RATED	NOT RECOMMENDED	NOT RATED	
ANTIRRHINUM MAJUS (snapdragon)	NOT RATED	NOT RECOMMENDED	NOT RATED	
• RHUS TRILOBATA BASKET BUSH	HIGH	NOT RECOMMENDED	NOT RATED	
• RIBES AUREUM GOLDEN CURRANT	NOT RATED	Recommended for all but coastal margin	NOT RATED	NATIVE
• RIBES INDECORUM WHITE FLOWERING CURRANT	NOT RATED	NOT RECOMMENDED	NOT RATED	
• RIBES MALVACEUM CHAPARRAL CURRENT	NOT RATED	NOT RECOMMENDED	NOT RATED	
• RIBES SANGUINEUM RED FLOWERING CURRANT	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• RIBES VIBURNIFOLIUM EVERGREEN CURRANT	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• RUELLIA CALIFORNICA RAMA PARDA	NOT RATED	NOT RECOMMENDED	NOT RATED	

• SALVIA MICROPHYLLA CHERRY/GRAHAM SAGE	NOT RATED	NOT RECOMMENDED	NOT RATED	
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HEDGE SHRUBS

BOTANICAL NAME / COMMON NAME				
• ARCTOSTAPHYLOS SPP. 'HOWARD MCMINN' HOWARD MCMINN	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
MANZANITA	NOT RATED	Recommended for coastal foothills and inland foothills	NOT RATED	NATIVE
BUXUS MICROPHYLLA JAPONICA JAPANESE BOXWOOD	MODERATE	NOT RECOMMENDED	HIGH	
BUXUS SEMPERVIRENS COMMON BOXWOOD	LOW	NOT RECOMMENDED	NOT RATED	
CHOISYA TERNATA MEXICAN ORANGE BLOSSOM	NOT RATED	NOT RECOMMENDED	NOT RATED	
COPROSMA REPENS MIRROR PLANT	HIGH	NOT RECOMMENDED	NOT RATED	
• COMAROSTAPHYLIS DIVERSIFOLIA SUMMER HOLLY	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• CORREA SPP. AUSTRALIAN FUCHSIA	NOT RATED	NOT RECOMMENDED	NOT RATED	
• DODONAEA VISCOSA 'PURPUREA' PURPLE HOPSEED BUSH	MODERATE	NOT RECOMMENDED	NOT RATED	
ESCALLONIA 'FRADES' ESCALLONIA	NOT RATED	NOT RECOMMENDED	NOT RATED	
EUGINIA MYRTIFOLIA/VARIETIES BRUSH CHERRY	NOT RATED	NOT RECOMMENDED	NOT RATED	
• EURYOPS PECTINATUS EURYOPS/SHRUB DAISY	UNDETERMINED	NOT RECOMMENDED	NOT RATED	
GREWIA CAFFRA LAVENDER STARFLOWER	NOT RATED	NOT RECOMMENDED	NOT RATED	
• HETEROMELES ARBUTIFOLIA TOYON	HIGH	RECOMMENDED	HIGH	NATIVE
• ILEX VOMITORIA YAUPON	HIGH	NOT RECOMMENDED	NOT RATED	

LIGUSTRUM JAPONICUM JAPANESE PRIVET	MODERATE	NOT RECOMMENDED	UNDETERMI NED	
LIGUSTRUM TEXANUM WAXLEAF PRIVET	NOT RATED	NOT RECOMMENDED	UNDETERMI NED	
• MAHONIA NEVINII NEVIN MAHONIA	HIGH	Recommended for all but coastal margin	LOW- MODERATE	NATIVE
• MALACOTHAMNUS FASCICULATUS BUSH MALLOW	NOT RATED	NOT RECOMMENDED	NOT RATED	
• MALOSMA LAURINA (RHUS LAURINA) LAUREL SUMAC	NOT RATED	NOT RECOMMENDED	NOT RATED	
MURRAYA PANICULATA ORANGE JESSAMINE	MODERATE	NOT RECOMMENDED	NOT RATED	
• MYRICA CALIFORNICA PACIFIC WAX MYRTLE	NOT RATED	NOT RECOMMENDED	NOT RATED	
• MYRSINE AFRICANA AFRICAN BOXWOOD	NOT RATED	NOT RECOMMENDED	NOT RATED	
• MYRTUS / VARIETIES MYRTUS	HIGH	NOT RECOMMENDED	MODERATE	
MYRTUS COMMUNIS 'COMPACTA' DWARF MYRTLE	HIGH	NOT RECOMMENDED	MODERATE	
PITTOSPORUM/VARIETIES PITTOSPORUM	NOT RATED	RECOMMENDED	UNDETERMI NED	
PHOTINIA FRASERI/VARIETIES FRASER'S PHOTINIA	LOW	RECOMMENDED	UNDETERMI NED	spp. All low
• PRUNUS I. ILICIFOLIA HOLLY LEAF CHERRY	HIGH	RECOMMENDED	HIGH	NATIVE
• RHAMNUS CALIFORNICUS COFFEEBERRY	HIGH	RECOMMENDED	NOT RATED	NATIVE
• RHUS INTEGRIFOLIA LEMONADE BERRY	HIGH	RECOMMENDED	NOT RATED	NATIVE
• SENNA STURTII (CASSIA STURTII) STURT'S CASSIA/SENNA	MODERATE	Recommended for all but coastal margin	NOT RATED	NATIVE
• TECOMA STANS YELLOW BELLS	MODERATE	NOT RECOMMENDED	NOT RATED	
TAXUS/VARIETIES YEWE	HIGH	NOT RECOMMENDED	NOT RATED	

• WESTRINGIA FRUITICOSA (ROSMARINIFORMIS) COAST ROSEMARY	NOT RATED	NOT RECOMMENDED	NOT RATED
• XYLOCOCCUS BICOLOR MISSION MANZANITA	NOT RATED	NOT RECOMMENDED	NOT RATED
VINES			
BOTANICAL NAME / COMMON NAME			
CISSUS VARIETIES GRAPE IVY	NOT RATED	NOT RECOMMENDED	NOT RATED
• CLEMATIS LASIANTHA PIPESTEM CLEMATIS	NOT RATED	NOT RECOMMENDED	NOT RATED
• CLEMATIS LIGUSTICIFOLIA WESTERN VIRGIN'S Bower	NOT RATED	NOT RECOMMENDED	NOT RATED
• CLYTOSTOMA CALLISTEGIOIDES LAVENDER TRUMPET VINE	LOW	NOT RECOMMENDED	NOT RATED
DISTICTIS BUCCINATORIA BLOOD RED TRUMPET VINE	NOT RATED	NOT RECOMMENDED	NOT RATED
FICUS PUMILA CREEPING FIG	HIGH	NOT RECOMMENDED	NOT RATED
HARDENBERGIA VIOLACEA HAPPY WANDERER	NOT RATED	NOT RECOMMENDED	NOT RATED
HIBERTIA SCANDENS GUINEA GOLD VINE	NOT RATED	NOT RECOMMENDED	NOT RATED
JASMINUM VARIETIES JASMINE	LOW	RECOMMENDED	NOT RATED
LONICERA HILDEBRANDIANA BURMESE HONEYSUCKLE	HIGH	NOT RECOMMENDED	NOT RATED
PANDOREA JASMINOIDES BOWER VINE	NOT RATED	NOT RECOMMENDED	NOT RATED
PARTHENCISSUS TRICUSPIDATA BOSTON IVY	NOT RATED	NOT RECOMMENDED	NOT RATED
PASSIFLORA ALATOCAERULEA PASSION VINE	NOT RATED	NOT RECOMMENDED	NOT RATED
POLYGONUM AUBERTII SILVER LACE VINE	NOT RATED	NOT RECOMMENDED	NOT RATED

SOLANDRA MAXIMA CUP OF GOLD VINE	NOT RATED	NOT RECOMMENDED	NOT RATED	
STEPHANOTIS FLORIBUNDA MADAGASCAR JASMINE	NOT RATED	NOT RECOMMENDED	NOT RATED	
TECOMERIA CAPENSIS CAPE HONEYSUCKLE	HIGH	RECOMMENDED	NOT RATED	
TRACHELOSPERMUM JASMINOIDES STAR JASMINE	HIGH	NOT RECOMMENDED	NOT RATED	
WISTERIA FLORIBUNDA JAPANESE WISTERIA	NOT RATED	NOT RECOMMENDED	NOT RATED	
WISTERIA SINENSIS CHINESE WISTERIA	NOT RATED	NOT RECOMMENDED	NOT RATED	
GROUND COVERS				
BOTANICAL NAME / COMMON NAME				
• ACACIA REDOLENS PROSTRATE ACACIA	HIGH	RECOMMENDED	NOT RATED	
• ACHILLEA CLAVENNAE SILVERY YARROW	NOT RATED	NOT RECOMMENDED	NOT RATED	
• ACHILLEA TOMENTOSA WOOLY YARROW	NOT RATED	NOT RECOMMENDED	NOT RATED	
ARCTOTHECA CALENDULA CAPE WEED	HIGH	NOT RECOMMENDED	NOT RATED	
• ARCTOSTAPHYLOS/VARIETIES MANZANITA	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
• ARTEMISIA SPP. (HERBACEOUS) TARRAGON/ANGEL'S HAIR	MODERATE	RECOMMENDED	NOT RATED	
• BACCHARIS PILULARIS 'PIGEON POINT' COYOTE BRUSH	NOT RATED	RECOMMENDED	HIGH	NATIVE
CAMPANULA POSCHARSKYANA SERBIAN BELL FLOWER	NOT RATED	NOT RECOMMENDED	NOT RATED	
• CEANOTHUS GRISEUS HORIZONTALIS CARMEL CREEPER	NOT RATED	RECOMMENDED	NOT RATED	NATIVE
CERASTIUM TOMENTOSUM SNOW-IN-SUMMER	NOT RATED	NOT RECOMMENDED	NOT RATED	

• CONVULVULUS SABATIUS GROUND MORNING GLORY	NOT RATED	RECOMMENDED	NOT RATED
• CYLINDROPHYLLUM SPECIOSA RED SPIKE ICE PLANT	NOT RATED	NOT RECOMMENDED	NOT RATED
• DALEA GREGGII TRAILING INDIGO BUSH	NOT RATED	NOT RECOMMENDED	NOT RATED
• DROSANTHEMUM HISPIDUM LAVENDER-PINK ICE PLANT	HIGH	NOT RECOMMENDED	NOT RATED
• DYMONDIA MARGARARETAE DYMONDIA	NOT RATED	NOT RECOMMENDED	NOT RATED
FELICIA AMELLOIDES BLUE MARGUERITE	NOT RATED	NOT RECOMMENDED	NOT RATED
FRAGARIA CHILOENSIS WILD STRAWBERRY	NOT RATED	NOT RECOMMENDED	NOT RATED
GAZANIA HYBRID/VARIETIES GAZANIA SPP	HIGH	RECOMMENDED	HIGH
HYPERICUM CALYCINUM ST. JOHN WORT	HIGH	RECOMMENDED	NOT RATED
• IVA HAYESIANA POVERTY WEED	HIGH	NOT RECOMMENDED	NOT RATED
• JUNIPERUS/VARIETIES JUNIPER	MODERATE	RECOMMENDED	UNDETERMI NED
• KECKIELLA ANTIRRHINOIDES YELLOW PENSTEMMON, PENSTEMMON SPP	HIGH	RECOMMENDED	NOT RATED
• KECKIELLA CORDIFOLIA HEART-LEAVED PENSTEMMON, PENSTEMMON SPP	HIGH	RECOMMENDED	NOT RATED
SENECIO MANDRALISCAE KLEINIA	NOT RATED	NOT RECOMMENDED	NOT RATED
• LAMPRANTHUS SPECTABILIS TRAILING ICE PLANT	HIGH	NOT RECOMMENDED	NOT RATED
• LANTANA MONTEVIDENSIS LANTANA	MODERATE	RECOMMENDED	HIGH
LIRIOPE/VARIETIES LILY TURF	HIGH	NOT RECOMMENDED	NOT RATED
LONICERA JAPONICA 'HALLIANA' HALL'S HONEYSUCKLE	LOW	NOT RECOMMENDED	NOT RATED

• MYOPORUM PARVIFOLIUM MYORPUM	HIGH	RECOMMENDED	NOT RATED
• OENOTHERA STUBBEI BAJA EVENING PRIMROSE	NOT RATED	NOT RECOMMENDED	NOT RATED
OSTEOSPERMUM FRUTICOSUS/VARIETIES TRAILING AFRICAN DAISY	NOT RATED	RECOMMENDED	NOT RATED
PACHYSANDRA TERMINALIS JAPANESE SPURGE	LOW	NOT RECOMMENDED	NOT RATED
PELARGONIUM PELTATUM IVY GERANIUM	LOW	NOT RECOMMENDED	MODERATE
• PLECOSTACHYS SERPYLLIFOLIA STRAW FLOWER	NOT RATED	NOT RECOMMENDED	NOT RATED
POTENTILLA VERNA SPRING CINQUEFOIL	NOT RATED	NOT RECOMMENDED	NOT RATED
• ROSMARINUS OFFICINALIS 'PROSTRATUS' ROSEMARY	HIGH	RECOMMENDED	UNDETERMI NED
• SEDUM/VARIETIES SEDUM	MODERATE	NOT RECOMMENDED	NOT RATED
• SENECIO MANDRALISCAE KLEINIA	NOT RATED	NOT RECOMMENDED	NOT RATED
TRACHELOSPERMUM JASMINOIDES STAR JASMINE	HIGH	NOT RECOMMENDED	NOT RATED
VERBENA LILIACINA 'DE LA MINA' LILIAC VERBENA	LOW	NOT RECOMMENDED	NOT RATED
VERONICA/VARIETIES SPEED WELL	NOT RATED	NOT RECOMMENDED	NOT RATED
VINCA MINOR DWARF RUNNING MYRTLE	LOW	NOT RECOMMENDED	NOT RATED
LAWNS AND TURF			
BALLFIELDS			
CYNODON SPECIES: HYBRID BERMUDA	HIGH	NOT RECOMMENDED	HIGH
GN-1	HIGH	NOT RECOMMENDED	HIGH

TIFGREEN	HIGH	NOT RECOMMENDED	HIGH
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GENERAL USE

FESTUCA ARUNDINACEA DRAWF TALL FESCUE (90%)	MODERATE	NOT RECOMMENDED	HIGH
BLUE GRASS (10%)	LOW	NOT RECOMMENDED	MODERATE
MEDALLION VARIETIES	MODERATE	NOT RECOMMENDED	HIGH
STENOTAPHREM SECUNDATUM ST. AUGUSTINE GRASS	MODERATE	NOT RECOMMENDED	NOT RATED

SHADE CONDITIONS

ORNAMENTAL GRASSES

BOTANICAL NAME / COMMON NAME			
• DESCHAMPSIA CAESPITOSA TUFTED HAIRGRASS	LOW	NOT RECOMMENDED	NOT RATED
• LEYMUS CONDENSATUS 'CANYON PRINCE' CANYON PRINCE WILD	NOT RATED	NOT RECOMMENDED	NOT RATED
RYE	MODERATE	NOT RECOMMENDED	HIGH
FESTUCA OVINA 'GLAUCA' BLUE FESCUE	LOW	NOT RECOMMENDED	NOT RATED
• FESTUCA RUBRA RED FESCUE	MODERATE	NOT RECOMMENDED	NOT RATED
MARATHON VARIETIES	MODERATE	NOT RECOMMENDED	HIGH
• MUHLENBERGIA RIGENS DEER GRASS	HIGH	NOT RECOMMENDED	NOT RATED
• NASSELLA CERNUA NODDING NEEDLEGRASS	LOW	NOT RECOMMENDED	NOT RATED
• NASSELLA LEPIDA FOOTHILL NEEDLEGRASS	LOW	NOT RECOMMENDED	NOT RATED

• NASSELLA PULCHRA PURPLE NEEDLEGRASS	LOW	NOT RECOMMENDED	NOT RATED	
OPHIOPOGON JAPONICUS MONDO GRASS	MODERATE	NOT RECOMMENDED	NOT RATED	
• PANICUM (NATIVE SPP.) SWITCH GRASS	MODERATE	NOT RECOMMENDED	NOT RATED	
• STIPA GIGANTEA GIANT NEEDLE GRASS	MODERATE	NOT RECOMMENDED	NOT RATED	
BIO-SWALES				
BOTANICAL NAME / COMMON NAME				
TREES				
ALNUS RHOMBIFOLIA WHITE ALDER	NOT RATED	NOT RECOMMENDED	LOW	
POPULUS FREMONTII WESTERN COTTONWOOD	HIGH	NOT RECOMMENDED	HIGH	
SHRUBS				
ARTEMISIA DOUGLASIANA MUGWORT	NOT RATED	NOT RECOMMENDED	NOT RATED	
BACCHARIS DOUGLASII MARSH BACCHARIS	NOT RATED	NOT RECOMMENDED	NOT RATED	
BACCHARIS EMORYI EMORY BACCHARIS	HIGH	NOT RECOMMENDED	NOT RATED	
BACCHARIS PILULARIS COYOTE BRUSH	HIGH	RECOMMENDED	HIGH	NATIVE
PERRENIALS				
ACHILLEA MILLEFOILUM COMMON YARROW	MODERATE	RECOMMENDED	NOT RATED	NATIVE
IRIS DOUGLASIANA DOUGLAS IRIS	NOT RATED	NOT RECOMMENDED	NOT RATED	
MIMULUS CARDINALIS SCARLET MONKEY	NOT RATED	RECOMMENDED	NOT RATED	NATIVE

FLOWER			
POTENTILLA EGEDII MARSH CINQUEFOIL	NOT RATED	NOT RECOMMENDED	NOT RATED
SISYRINCHIUM BELLUM BLUE-EYED GRASS	NOT RATED	NOT RECOMMENDED	NOT RATED
GRASSES/SEDGES			
CAREX GLOBOSA GLOBE SEDGE	NOT RATED	NOT RECOMMENDED	NOT RATED
CAREX SUBFUSCA RUSTY SEDGE	NOT RATED	NOT RECOMMENDED	NOT RATED
CAREX TUMULICOLA BERKELEY SEDGE	NOT RATED	NOT RECOMMENDED	NOT RATED
JUNCUS PATENS COMMON RUSH	NOT RATED	NOT RECOMMENDED	NOT RATED
.. - LOW WATER USAGE PLANT • - LOW WATER USAGE PLANT			

The plant list was review using an approximated soil analysis for Los Angeles county and average recycled water results. No soil or water test results were submitted and the goal of this review was to provide baseline guidance which could be utilized in assessing an already established plant portfolio. This list does not reflect a comprehensive investigation of all known salinity and boron related information. The selected resources represent an established population of respected researchers, horticulturists, educators, and agronomists.

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Wu, L., and L. Dodge, 2005. Landscape Salt Tolerance Selection Guide for Recycled Water Irrigation. Special Report for the Elvenia J. Slosson Endowment Fund. [Online] Available at: <http://ucce.ucdavis.edu/files/filelibrary/5505/20066.pdf> (accessed December 2010). University of California Agricultural and Natural Resources, Slosson Research for Ornamental Horticulture, Davis, CA.

APPENDIX B

Example Retrofit Drawing Design – Van Nuys High School

LOS ANGELES DEPARTMENT OF WATER AND POWER

WATER RECLAMATION PROGRAM

ON-SITE FACILITIES DRAWINGS

GENERAL NOTES

- CONTRACTOR SHALL NOTIFY THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH (DPH) AT (213) 351-7359 PRIOR TO BACKFILLING. ALL WORK PERFORMED WITHOUT THE BENEFIT OF INSPECTION SHALL BE SUBJECT TO REMOVAL.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LOS ANGELES COUNTY RECYCLED WATER USER MANUAL, LATEST EDITION, AND THE COUNTY OF LOS ANGELES DPH REQUIREMENTS.
- ALL BACKFLOW PREVENTER INSTALLATIONS AND LOCATIONS SHALL BE SUBJECT TO APPROVAL BY LADWP.
- ALL PUBLIC FACILITIES SUCH AS COMFORT STATIONS, DRINKING FOUNTAINS, ETC. SHALL BE PROTECTED FROM SPRAY AND/OR MISTING BY RECYCLED WATER.
- NO PONDING, RUN-OFF OR OVER-SPRAY IS PERMITTED. ADJUST ALL SPRINKLER HEADS TO MINIMIZE OVER SPRAYING ONTO SIDEWALKS, STREETS, PRIVATE LOTS AND ALL OTHER NON-APPROVED USE AREAS.
- HOSE BIBBS ON RECYCLED WATER SYSTEMS ARE PROHIBITED.
- ON-SITE CROSS CONNECTION BETWEEN RECYCLED WATER LINES AND POTABLE WATER LINES IS STRICTLY PROHIBITED.
- INSTALL APPROVED, METALLIC BACKED AND STENCILED WARNING TAPE OVER ALL PRESSURE RECLAIMED WATER LINE. STENCIL AND COLOR CODE (PURPLE PANTONE #522) ALL IRRIGATION PIPE. ORIENT THE STENCILING TO THE TOP OF THE TRENCH.
- PROVIDE A MINIMUM OF AT LEAST 18 INCHES OF COVER OVER ALL WIRING AND PIPING.
- OPERATE THE IRRIGATION SYSTEM ONLY BETWEEN 9:00 PM AND 6:00 AM.
- WHERE POTABLE LINES AND RECYCLED WATER LINES CROSS, THE RECYCLED LINE SHALL BE INSTALLED WITHIN A PROTECTIVE SLEEVE. THE SLEEVE SHALL EXTEND 10-FEET FROM EACH SIDE, FROM THE CENTER LINE OF POTABLE LINE FOR A TOTAL OF 20-FEET.
- MAINTAIN A 10 FOOT HORIZONTAL SEPARATION BETWEEN POTABLE WATER AND RECYCLED WATER LINES. INSTALL RECYCLED WATER LINE BELOW THE POTABLE WATER LINE.
- PROVIDE A MINIMUM OF 12 INCHES OF VERTICAL SEPARATION BETWEEN POTABLE/RECYCLED WATER LINES.
- TAG ALL VALVES AND OTHER BELOW GRADE FACILITIES WITHIN BOXES WITH PERMANENT RECYCLED WATER LABELS THAT ID THE FACILITY AS "RECYCLED WATER - DO NOT DRINK" IN BOTH SPANISH AND ENGLISH. ATTACH THE LABEL WITH EITHER STAINLESS STEEL WIRE OR SELF LOCKING PLASTIC TIES.
- THE REQUIRED CROSS CONNECTION TEST SHALL BE DONE BY LADWP AND LOS ANGELES DPH. COPIES OF INSPECTION REPORTS WILL BE FORWARDED TO THE NON-INSPECTING PARTY.
- PRIOR TO CONVERSION TO RECYCLED WATER, AN ON-SITE SUPERVISOR SHALL BE DESIGNATED IN WRITING. THIS INDIVIDUAL SHALL BE FAMILIAR WITH PLUMBING SYSTEMS WITHIN THE PROPERTY, AND SPECIFIC REQUIREMENTS OF RECYCLED WATER SYSTEMS.
- A PHYSICAL SEPARATION SHALL BE PROVIDED BETWEEN ADJACENT AREAS OF IRRIGATION WITH RECYCLED WATER AND POTABLE WATER. SEPARATION SHALL BE PROVIDED THROUGH THE USE OF CONCRETE MOW STRIPS, CHAIN FENCES, OR OTHER MEANS AS APPROVED BY LADWP OR THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH.
- IT IS THE RESPONSIBILITY OF THE OWNER TO EDUCATE ALL MAINTENANCE PERSONNEL ON A CONTINUOUS BASIS WITH THE PRESENCE OF RECYCLED WATER.
- NEW QUICK COUPLERS SHALL BE OF A TYPE APPROVED FOR RECYCLED WATER USE AND SHALL HAVE PURPLE CAPS.
- EXISTING QUICK COUPLERS WHICH ARE NOT APPROVED FOR RECYCLED WATER USE SHALL BE REPLACED WITH A ROTARY TYPE HEAD.
- EXISTING VALVES WHICH ARE NOT EXACT AND NOT ALL DETAILS ARE SHOWN. FINAL LOCATIONS SHALL BE FIELD VERIFIED BY THE OWNER.
- NEW AND EXISTING RECYCLED WATER VALVES, INCLUDING GATE VALVES, REMOTE CONTROL VALVES, PURGE VALVES, AUTOMATIC CONTROLLERS, AND QUICK COUPLERS SHALL BE TAGGED PER TITLE 22 REQUIREMENTS. ABOVE GROUND RECYCLED WATER PIPING SHALL BE PURPLE.
- RECYCLED WATER LABELS THAT ID A FACILITY SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING WORDING "RECYCLED WATER - DO NOT DRINK" IN BOTH SPANISH AND ENGLISH. ATTACH THE LABEL WITH EITHER STAINLESS STEEL WIRE OR SELF LOCKING PLASTIC TIES.
- IMPACT SPRINKLERS LOCATED IN RECYCLED WATER USE AREAS SHALL BE REPLACED WITH A ROTARY TYPE HEAD.
- THIRST BLOCKS, IF REQUIRED, SHALL BE DESIGNED AND INSTALLED ACCORDING TO CITY OF LOS ANGELES STANDARD DRAWING NO. A9441.
- IT IS THE RESPONSIBILITY OF THE OWNER TO VERIFY THAT THERE ARE NO VALVES LOCATED WITHIN THE PROJECT SITE THAT ARE IN THE "CLOSED" POSITION.
- XXXXXXXXXXXX, (XXX) XX-XXXX, IS THE DESIGNATED SITE SUPERVISOR FOR VAN NUYS HIGH SCHOOL. VAN NUYS HIGH SCHOOL SHALL NOTIFY LADWP IN WRITING, WITHIN 48 HOURS, OF ANY CHANGES TO THE SITE SUPERVISOR CONTACT INFORMATION.
- IT IS THE RESPONSIBILITY OF THE OWNER TO INSTALL AND MAINTAIN ALL RECYCLED WATER FACILITIES PER LADWP STANDARD SPECIFICATIONS & DRAWINGS, CDPH REQUIREMENTS, AND TITLE 22 OF THE CALIFORNIA CODE OF REGULATIONS.
- IRRIGATION DURING HOURS OUTSIDE OF THE WATERING WINDOW SPECIFIED IN NOTE 10 SHALL BE CONDUCTED IN THE PRESENCE OF THE DESIGNATED RECYCLED WATER SUPERVISOR.
- OWNER SHALL INSTALL REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTION DEVICES AT ALL DOMESTIC WATER CONNECTIONS PRIOR TO PROJECT ACCEPTANCE BY CDPH.



LOCATION MAP
NOT TO SCALE

Sheet Index	Title Sheet
1	Recycled Water Use Area & Sheet Legend
2	Irrigation Retrofit
3-8	Irrigation Details
9	Details & County DPH Notes
10	

ABBREVIATIONS	
F.H.	FIRE HYDRANT
EXIST.	EXISTING
IRR	IRRIGATION
PW	POTABLE WATER
NTS	NOT TO SCALE
B.O.	BLOW OFF
RW	RECYCLED WATER
FS	FIRE SERVICE
RP	REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER
RCV	REMOTE CONTROL VALVE
CV	CHECK VALVE

POTABLE WATER METER	RECYCLED WATER METER
CHECK VALVE	GATE VALVE/CORP. STOP
PERMANENT CAP	QUICK COUPLER VALVE
IRRIGATION GATE VALVE	REMOTE CONTROL VALVE
FIRE HYDRANT	"DO NOT DRINK" SIGN
BACKFLOW PREVENTER ASSEMBLY	PRESSURE VACUUM BREAKER (PVB)
HOSE BIBB	

LEGAL DESCRIPTION:
AN 2236-019-901
LOT SIZE 27.9 AC

RECYCLED WATER IRR. AREA	POTABLE WATER IRR. AREA
DEMOLISH	EXIST. RECYCLED WATER LINE
NEW RECYCLED WATER LINE	EXIST. POTABLE WATER LINE
EXIST. IRRIGATION LINE	NEW POTABLE WATER LINE
PROPERTY LINE	

300 S. GRAND AVENUE
2nd FLOOR
LOS ANGELES, CA 90071
213-330-7305

APPROVED BY:

DATE:

60093807-0002

NOT TO SCALE

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC HEALTH

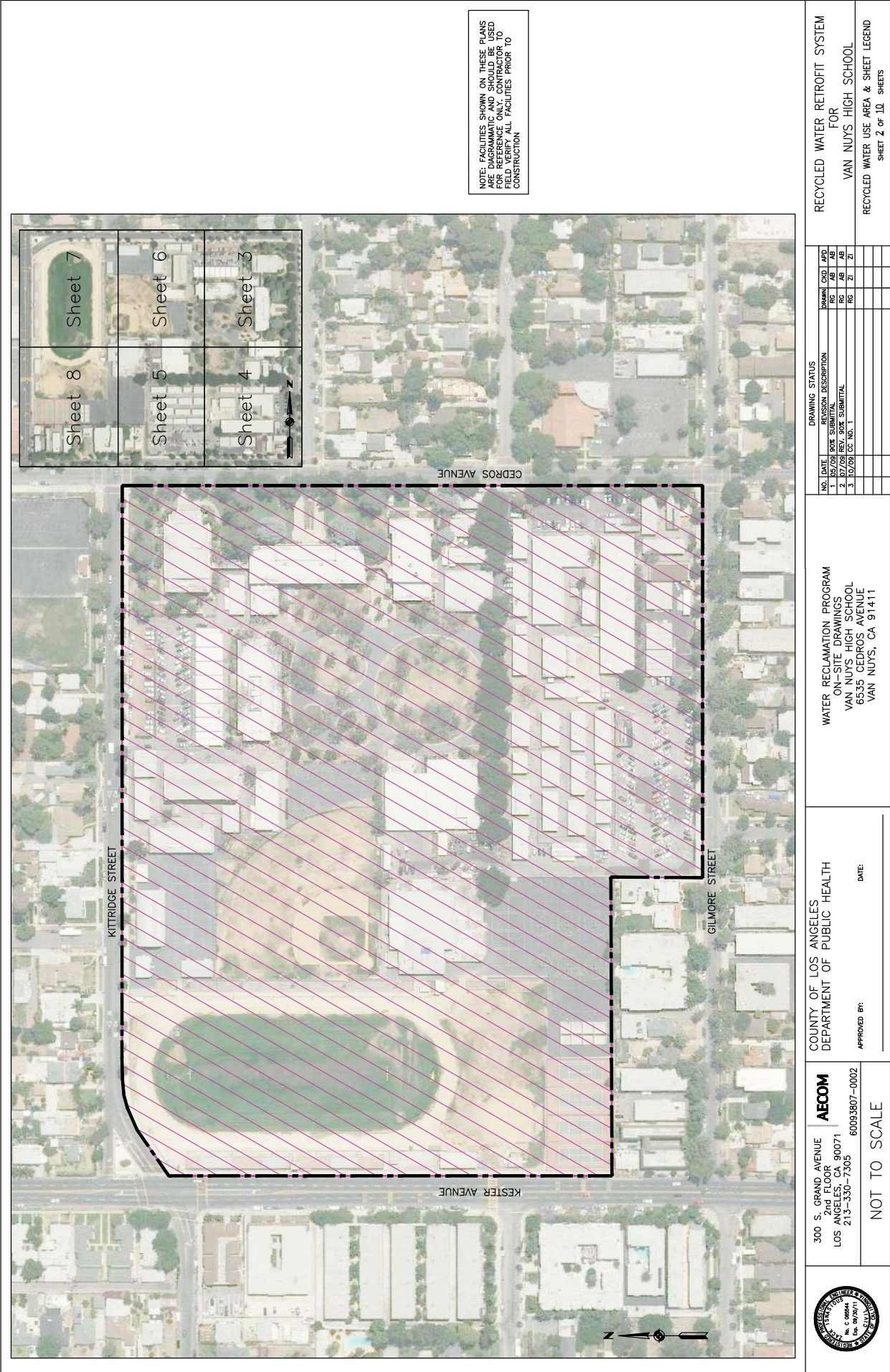
WATER RECLAMATION PROGRAM
ON-SITE DRAWINGS
VAN NUYS HIGH SCHOOL
6535 CEDROS AVENUE
VAN NUYS, CA 91411

DRAWING STATUS


NO.	DATE	REVISION	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	05/09	90% SUBMITTAL		RG	AB	AB
2	07/28	REV. BOX SUBMITTAL		RG	AB	AB
3	10/28	CG NO. 1		RG	ET	ET

RECYCLED WATER RETROFIT SYSTEM
FOR
VAN NUYS HIGH SCHOOL

TITLE SHEET
SHEET 1 of 10 SHEETS



NOTE: FACILITIES SHOWN ON THESE PLANS
ARE DIAGRAMMATIC AND SHOULD BE USED
FOR REFERENCE ONLY. CONTRACTOR TO
VERIFY ALL UTILITIES PRIOR TO
CONSTRUCTION

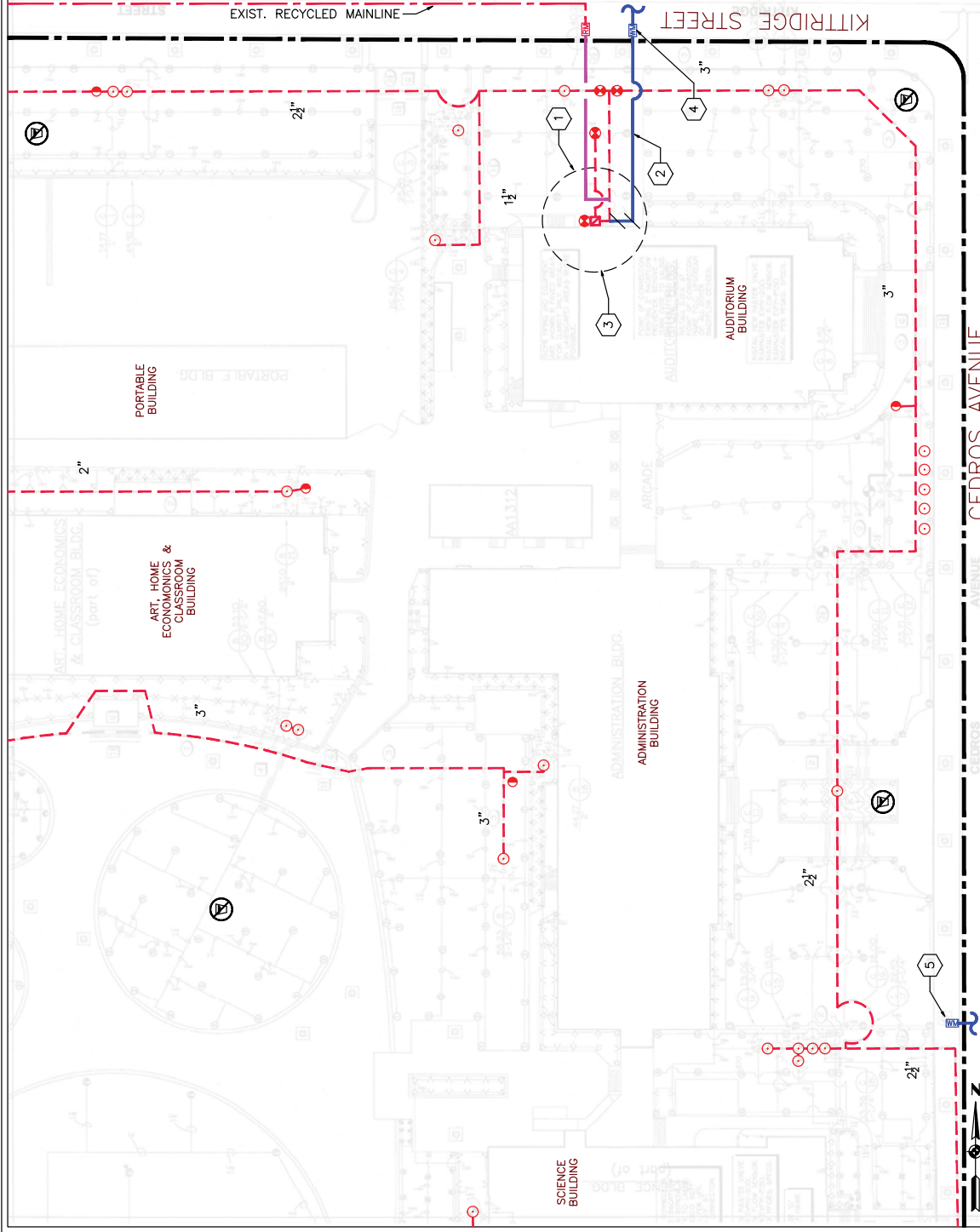
	300 S. GRAND AVENUE 2nd FLOOR, CA 90071 LOS ANGELES, CA 90071 213-330-7305	AECOM	60093807-0002	NOT TO SCALE	APPROVED BY: _____ DATE: _____	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH	WATER RECLAMATION PROGRAM ON-SITE DRAWINGS VAN NUYS HIGH SCHOOL 6535 CEDROS AVENUE VAN NUYS, CA 91411	DRAWING STATUS NO. DATE REVISION DESCRIPTION 1 05/08 BOX SUBMITTAL 2 07/08 BOX SUBMITTAL 3 07/08 BOX SUBMITTAL 4 07/08 BOX SUBMITTAL 5 07/08 BOX SUBMITTAL 6 07/08 BOX SUBMITTAL 7 07/08 BOX SUBMITTAL 8 07/08 BOX SUBMITTAL 9 07/08 BOX SUBMITTAL 10 07/08 BOX SUBMITTAL	RECYCLED WATER RETROFIT SYSTEM FOR VAN NUYS HIGH SCHOOL RECYCLED WATER USE AREA & SHEET LEGEND SHEET 2 OF 10 SHEETS

CONSTRUCTION NOTES:

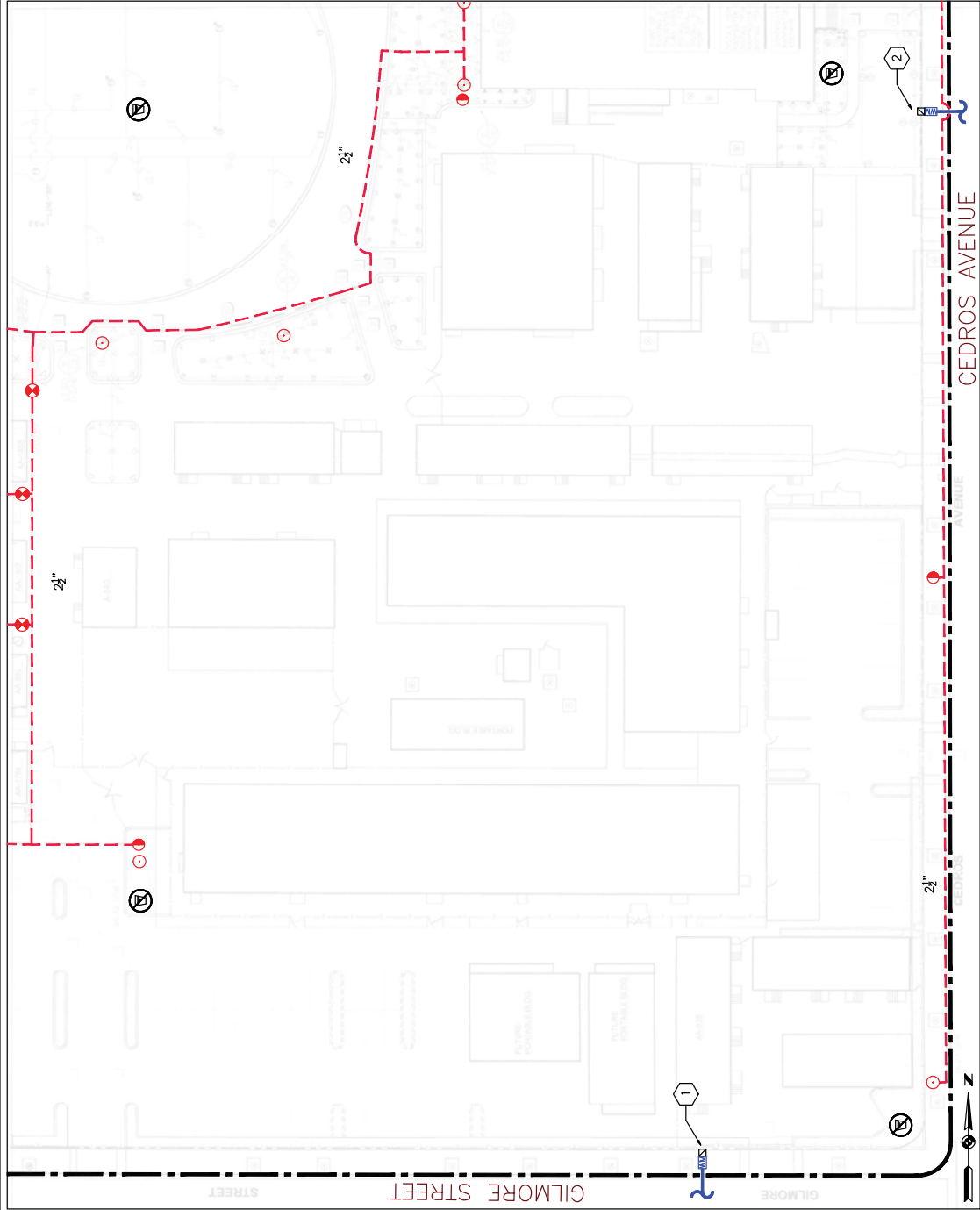
1. POINT OF CONNECTION. SEE DETAIL 1, SHEET 9.
2. EXIST. POTABLE WATER SERVICE.
3. UPGRADE EXISTING DOMESTIC BACKFLOW PREVENTION FROM DOUBLE CHECK PREVENTOR CHECK ASSEMBLIES TO REDUCED PRESSURE PRINCIPAL BACKFLOW DEVICES PER CDPH REQUIREMENTS. CDPH REPRESENTATIVE SHALL BE PRESENT AT TIME OF CONSTRUCTION.
4. EXIST. 4" DOMESTIC METER (M/N 90091672) WITH DOUBLE CHECK BACKFLOW PREVENTION DEVICE IN PARALLEL WITH COLT 200 DOUBLE CHECK DETECTOR CHECK. EXISTING PREVENTION DEVICE SHALL BE REPLACED WITH REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTION DEVICE PER LADWP AND CDPH REQUIREMENTS.
5. EXIST. 4" UT028874 FIRE SERVICE METER (M/N 5591454) CURRENTLY HAS NO BACKFLOW PREVENTION DEVICE. INSTALL DOUBLE CHECK DETECTOR CHECK BACKFLOW PREVENTION DEVICE PER LADWP AND CDPH REQUIREMENTS.



NOTE: FACILITIES SHOWN ON THESE PLANS ARE DIAGRAMATIC AND SHOULD BE USED AS A GUIDE ONLY. FIELD VERIFY ALL FACILITIES PRIOR TO CONSTRUCTION.

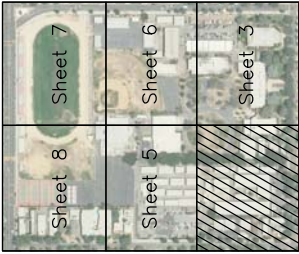


<div></div> <div>300 S. GRAND AVENUE 2nd FLOOR LOS ANGELES, CA 90071 213-330-7305</div> <div>AECOM</div> <div>APPROVED BY: 60093807-0002</div> <div>NOT TO SCALE</div>	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH	WATER RECLAMATION PROGRAM ON-SITE DRAWINGS VAN NUYS HIGH SCHOOL 6535 CEDROS AVENUE VAN NUYS, CA 91411	<table><tr><th>NO.</th><th>DATE</th><th>REVISION DESCRIPTION</th><th>ISSUED</th><th>CHKD</th><th>APPD</th></tr><tr><td>1</td><td>05/09</td><td>90% SUBMITTAL</td><td>RC</td><td>AB</td><td>AB</td></tr><tr><td>2</td><td>07/09</td><td>REV. 90% SUBMITTAL</td><td>RC</td><td>AB</td><td>AB</td></tr><tr><td>3</td><td>10/09</td><td>CC NO. 1</td><td>RC</td><td>ZI</td><td>ZI</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>				NO.	DATE	REVISION DESCRIPTION	ISSUED	CHKD	APPD	1	05/09	90% SUBMITTAL	RC	AB	AB	2	07/09	REV. 90% SUBMITTAL	RC	AB	AB	3	10/09	CC NO. 1	RC	ZI	ZI																																				
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RECYCLED WATER RETROFIT SYSTEM		FOR		VAN NUYS HIGH SCHOOL		IRRIGATION RETROFIT																																																												
						SHEET 3 OF 10 SHEETS																																																												



CONSTRUCTION NOTES:

1. EXIST. 1-1/2" DOMESTIC METER (M/N 90060781) WITH REDUCED PRESSURE PRINCIPAL BACKFLOW PROTECTION DEVICE TO BE PROTECTED IN PLACE.
2. EXIST. 6" DOMESTIC METER (M/N 90154066) WITH REDUCED PRESSURE BACKFLOW PREVENTION DEVICE TO BE PROTECTED IN PLACE.



NOTE: FACILITIES SHOWN ON THESE PLANS ARE DIAGRAMMATIC AND SHOULD BE USED FOR GENERAL INFORMATION ONLY. CONTRACTOR TO FIELD VERIFY ALL FACILITIES PRIOR TO CONSTRUCTION

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NOT TO SCALE

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC HEALTH

WATER RECLAMATION PROGRAM
ON-SITE DRAWINGS
VAN NUYS HIGH SCHOOL
6535 CEDROS AVENUE
VAN NUYS, CA 91411

DRAWING STATUS		REVISION		DATE	
NO.	DATE	DESCRIPTION	BY	CHK	APP
1	10/09	REV. SUBMITTAL	RG	AB	AB
2	07/09	REV. SUBMITTAL	RG	AB	AB
3	10/09	CC NO. 1	RG	ZI	ZI


RECYCLED WATER RETROFIT SYSTEM
FOR
VAN NUYS HIGH SCHOOL
IRRIGATION RETROFIT

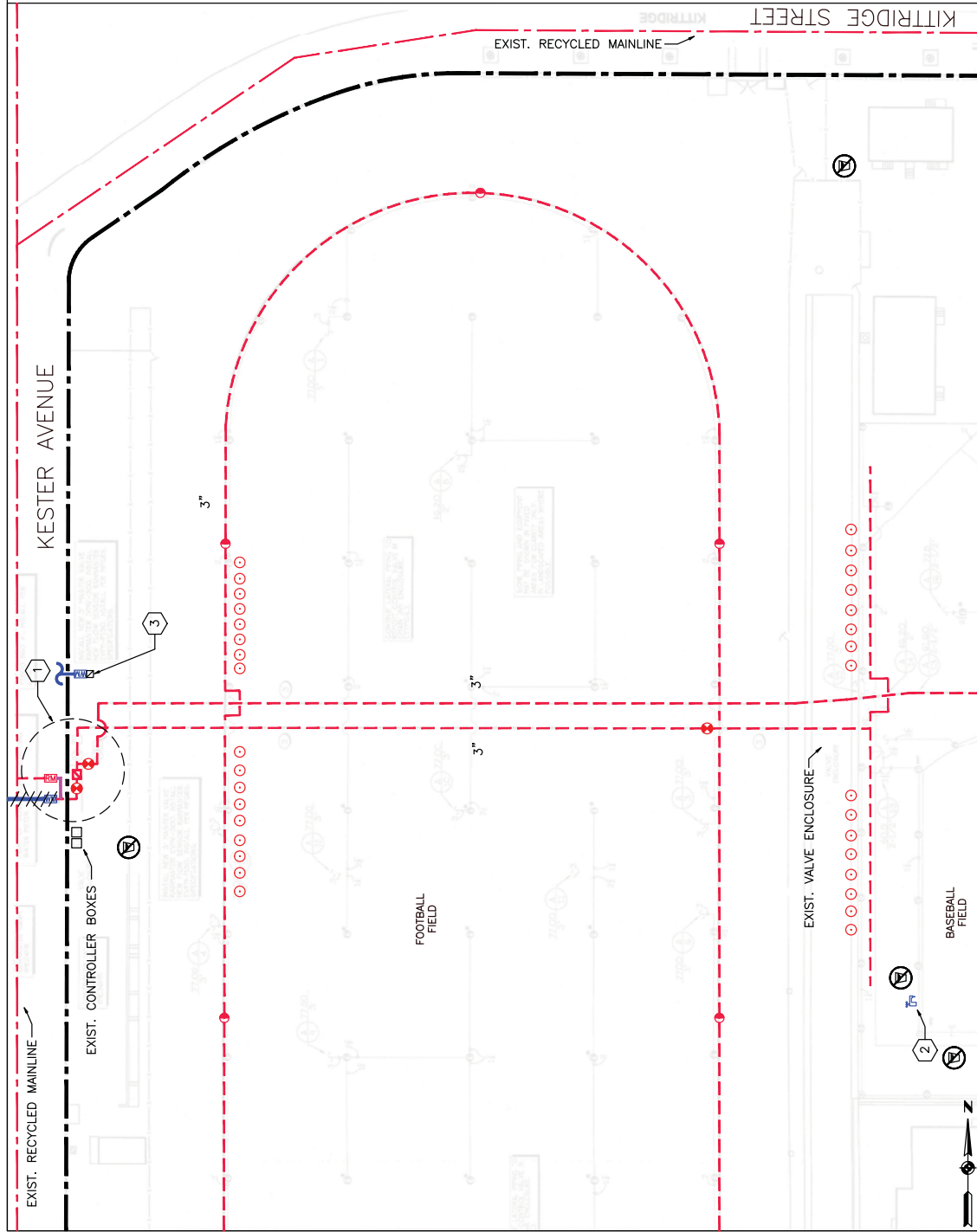
SHEET 4 OF 10 SHEETS

[illegible]

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NOTE: FACILITIES SHOWN ON THESE PLANS ARE DIAGRAMMATIC AND SHOULD BE USED FOR REFERENCE ONLY. CONTRACTOR TO FIELD VERIFY ALL FACILITIES PRIOR TO CONSTRUCTION


<div><div><div>AECOM</div><div>300 S. GRAND AVENUE 2nd FLOOR LOS ANGELES, CA 90071 213-330-7305</div><div>APPROVED BY: </div><div>NOT TO SCALE</div></div></div>	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH	WATER RECLAMATION PROGRAM ON-SITE DRAWINGS VAN NUYS HIGH SCHOOL 6535 CEDROS AVENUE VAN NUYS, CA 91411	DRAWING STATUS					
			NO.	DATE	REVISION DESCRIPTION	DRAWN	CHECKED	APP'D
					90% SUBMITTAL	RG	AB	AB
				2/27/09	REV. 90% SUBMITTAL	RG	AB	AB
			3	10/09	CC NO. 1	RG	ZI	ZI
			IRIGATION RETROFIT					
			SHEET 6 OF 10 SHEETS					

CONSTRUCTION NOTES:

1. POINT OF CONNECTION. SEE DETAIL 2, SHEET 9.
2. INSTALL POTABLE HOSE BIBB WITH APPROPRIATE BACKFLOW PROTECTION. (TYPE AND LOCATION TO BE DETERMINED BY OWNER)
3. EXIST. 3" DOMESTIC METER (M/N 90154137) WITH DOUBLE CHECK DETECTOR CHECK BACKFLOW PREVENTION ASSEMBLY TO BE REPLACED WITH REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTION DEVICE PER CDPH REQUIREMENTS.

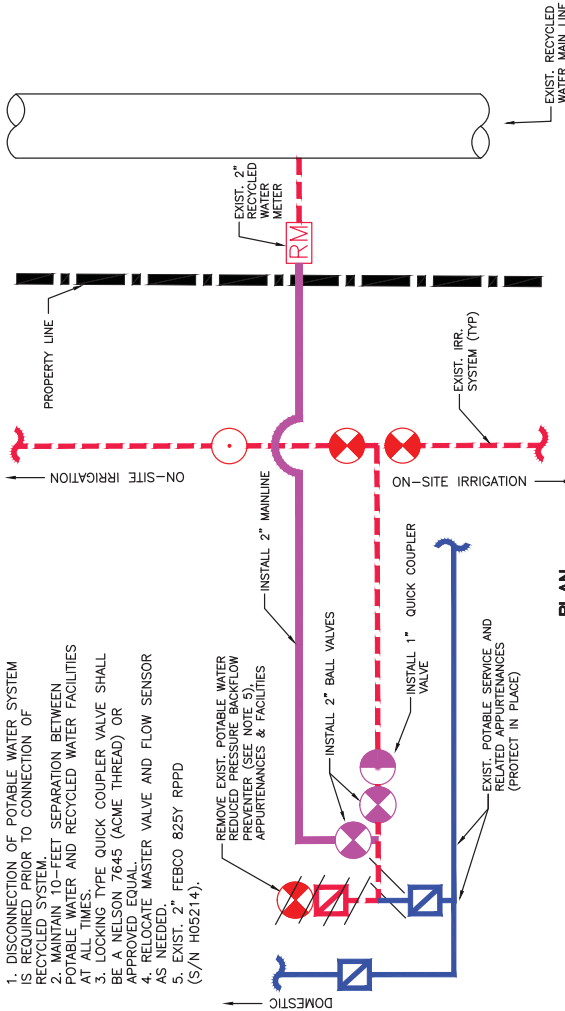


NOTE: FACILITIES SHOWN ON THESE PLANS ARE DIAGRAMMATIC AND SHOULD BE USED FOR REFERENCE ONLY. CONTRACTOR TO FIELD VERIFY ALL FACILITIES PRIOR TO CONSTRUCTION

	300 S. GRAND AVENUE 2nd FLOOR LOS ANGELES, CA 90071 213--330-7305	AECOM APPROVED BY: _____ DATE: _____ 60093807-0002	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH	WATER RECLAMATION PROGRAM ON-SITE DRAWINGS VAN NUYS HIGH SCHOOL 6535 CEDROS AVENUE VAN NUYS, CA 91411	DRAWING STATUS					RECYCLED WATER RETROFIT SYSTEM FOR VAN NUYS HIGH SCHOOL IRRIGATION RETROFIT SHEET 7 of 10 SHEETS
					WS DATE	REVISION DESCRIPTION	ISSUED	CD	UPD	
	1 04/09	90% SUBMITTAL	RD		AB	AB				
	2 07/09	REV. 90% SUBMITTAL	RD		AB	AB				

NOTE:

1. DISCONNECTION OF POTABLE WATER SYSTEM IS REQUIRED PRIOR TO CONNECTION OF RECYCLED SYSTEM.
2. MAINTAIN 10--FEET SEPARATION BETWEEN POTABLE WATER AND RECYCLED WATER FACILITIES AT ALL TIMES.
3. LOCKING TYPE QUICK COUPLER VALVE SHALL BE A NELSON 7645 (ACME THREAD) OR APPROVED EQUAL.
4. RELOCATE MASTER VALVE AND FLOW SENSOR AS NEEDED.
5. EXIST. 2" FEBCO 825Y RPPD (S/N H05214).



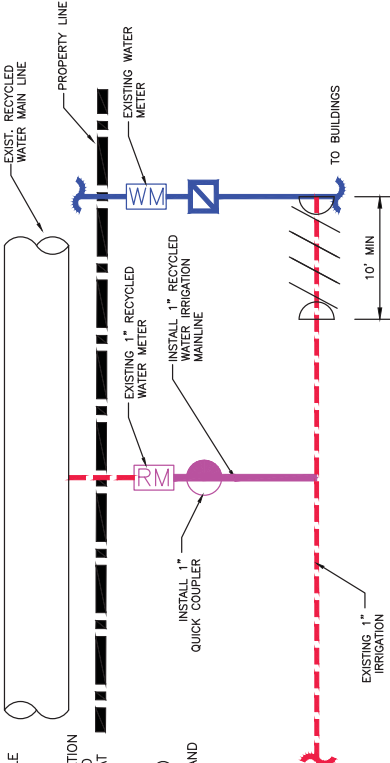
PLAN

DETAIL 1 -- RECYCLED WATER CONNECTION DETAIL

NOT TO SCALE

NOTE:

1. DISCONNECTION OF POTABLE WATER SYSTEM IS REQUIRED PRIOR TO CONNECTION OF RECYCLED SYSTEM.
2. MAINTAIN 10--FEET SEPARATION BETWEEN POTABLE WATER AND RECYCLED WATER FACILITIES AT ALL TIMES.
3. LOCKING TYPE QUICK COUPLER VALVE SHALL BE A NELSON 7645 (ACME THREAD) OR APPROVED EQUAL.
4. RELOCATE FLOW SENSOR AND MASTER VALVE AS NEEDED.



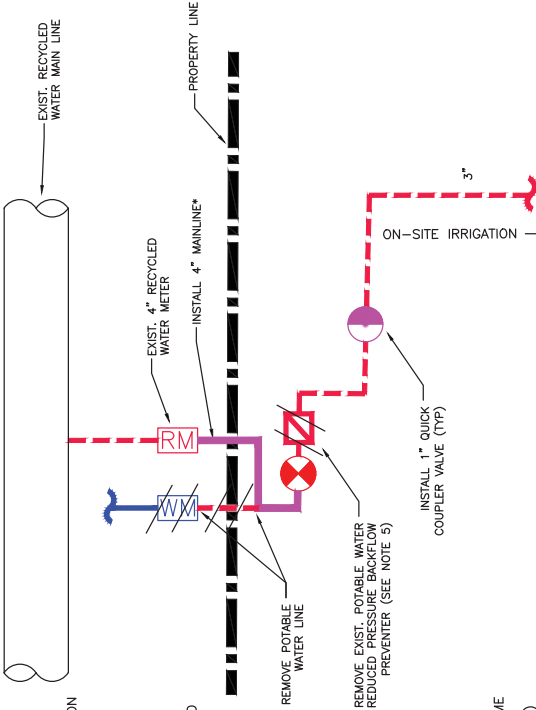
PLAN

DETAIL 3 -- RECYCLED WATER CONNECTION DETAIL

NOT TO SCALE

NOTE:

1. DISCONNECTION OF POTABLE WATER SYSTEM IS REQUIRED PRIOR TO CONNECTION OF RECYCLED SYSTEM.
2. MAINTAIN 10--FEET SEPARATION BETWEEN POTABLE WATER AND RECYCLED WATER FACILITIES AT ALL TIMES.
3. LOCKING TYPE QUICK COUPLER VALVE SHALL BE A NELSON 7645 (ACME THREAD) OR APPROVED EQUAL.
4. RELOCATE FLOW SENSOR AND MASTER VALVE AS NEEDED.
5. EXIST. 3" FEBCO 860 RPPD (S/N 0207300810).



PLAN

DETAIL 2 -- RECYCLED WATER CONNECTION DETAIL

NOT TO SCALE

NOTE: CONTRACTORS MUST VERIFY THAT THE RECYCLED WATER BACKFLOW PREVENTOR IS ON THE MOST CURRENT UNIVERSITY OF SOUTHERN CALIFORNIA LIST OF APPROVED BACKFLOW PREVENTORS FOR RECYCLED WATER USE.

* NEW MAINLINE SHALL BE SAME SIZE AS EXISTING MAINLINE (VERIFY DURING CONSTRUCTION)



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COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC HEALTH
APPROVED BY: _____
DATE: _____

WATER RECLAMATION PROGRAM
ON-SITE DRAWINGS
VAN NUYS HIGH SCHOOL
6535 CEDROS AVENUE
VAN NUYS, CA 91411

DRAWING STATUS		REVISION DESCRIPTION		DATE	BY
NO.	DATE	DESCRIPTION	DATE	BY	DATE
1	07/08	REV. BOX SUBMITAL	07/08	AB	AB
2	07/08	REV. BOX SUBMITAL	07/08	AB	AB
3	10/09	CC NO. 1	10/09	ZI	ZI

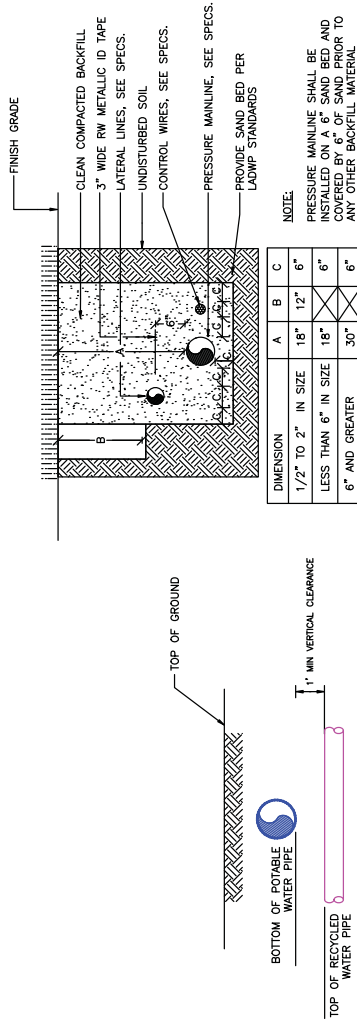
RECYCLED WATER RETROFIT SYSTEM
FOR
VAN NUYS HIGH SCHOOL
IRRIGATION DETAILS
SHEET 9 OF 10 SHEETS

COUNTY OF LOS ANGELES — DEPARTMENT OF HEALTH SERVICES
PUBLIC HEALTH PROGRAMS AND SERVICES — ENVIRONMENTAL HEALTH
CROSS-CONNECTION & WATER POLLUTION CONTROL PROGRAM
3025 Commerce Drive, Buena Park, CA 91706 (800) 430-3260

A GUIDE TO SAFE RECYCLED WASTEWATER USE, PIPELINE CONSTRUCTION AND INSTALLATION

1. Recycled wastewater shall meet requirements specified in "Wastewater Reclamation Criteria": Title 22, Division 4, Chapter 3, Section 60301 through 60355 of the California Code of Regulations and regulations and guidelines of the regulatory agencies.
2. Recycled wastewater use shall be compatible with State Department of Health Services and Regional Water Quality Control Board requirements.
3. Prior to construction, the County of Los Angeles Department of Health Services shall be submitted for review and approval to the County of Los Angeles Department of Health Services prior to implementation.
4. Prior to commencing construction the Contractor shall contact the Los Angeles County Department of Health Services to arrange for inspection of all on-site recycled and potable water work. No excavation or open trench may be backfilled without first securing Health Department approval, if any piping, recycled or potable, is installed prior to plan check approval and/or inspection, all or any portion of the system may be required to be exposed and corrected as necessary.
5. SEPARATION — In order to minimize construction accidents resulting in pipeline breaks, infiltration of wastewater from leaking wastewater lines into domestic water lines, or accidental cross-connections between recycled wastewater and potable water systems, maximum attainable separation of recycled wastewater lines and potable water lines shall be practiced.
- a. Parallel construction: there shall be at least a ten foot (10') separation, all distances measured from pipeline outside diameter.
- b. Crossed construction: As perpendicular as possible; one foot (1') separation, with potable above recycled; full pipe encased in concrete.
- c. Alternate Cross-Over construction (distance not maintained): Either the potable or recycled water lines may be skewed with the same class piping for one full pipe length (minimum ten feet) centered over the cross-over.
- d. The recycled wastewater system shall be constructed in conformance with potable water system construction standards and in accordance with all other governing codes, rules and regulations.
- e. Unused or abandoned potable water lines are to be severed as close to water mains as practical, capped and a ten-foot section of abandoned line removed and cemented under Health Department supervision.
- f. Existing on-site piping — To the extent feasible, maximum separation of recycled wastewater and potable water lines shall be practiced upon system addition or modification.
6. IDENTIFICATION: — All recycled wastewater lines (pressure/non-pressure), valve boxes, hydrants and appurtenances shall be identified to clearly distinguish between recycled wastewater, non-potable and potable water systems.
- a. RECYCLED WASTEWATER — All buried recycled wastewater lines (pressure/non-pressure) shall be purple colored pipe with continuous wording "Caution Recycled Water" printed on opposite sides of the pipe.
- For limited application, the use of continuous lettering on three inch (3") minimum width purple tape with one inch black or white contrasting lettering bearing the continuous wording "Caution Recycled Water" permanently affixed at ten foot intervals atop all horizontal piping, laterals and mains is permitted. Identification tape shall extend to all water service connections, valves, hydrants, and appurtenances.
- b. POTABLE WATER — All potable water lines shall be installed in accordance with the Uniform Plumbing Code and all other governing codes, rules and regulations. Buried potable water lines shall be identified by continuous lettering on three inch (3") minimum width blue tape with one inch white lettering bearing the continuous wording "Potable Water" permanently affixed at ten foot intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and/or vaults, exposed piping and hydrants.
- Identification tape is not necessary for extruded colored PVC with continuous wording "Potable Water" printed in contrasting lettering on opposite sides of the pipe.
- c. NON-POTABLE WATER — All non-potable irrigation/industrial water lines (pressure/non-pressure) shall be identified by continuous lettering on three inch (3") minimum width tape with one inch contrasting lettering bearing the continuous wording "Non-Potable Water" permanently affixed at ten foot intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and/or vaults, exposed piping, hydrants and quick couplers. Non-potable water is water supplied from the potable water system through an appropriate backflow preventer.
- Exposed piping, valve boxes, vaults, control valves, quick coupling valves, outlets and related appurtenances shall be color coded and labeled or tagged to differentiate between recycled wastewater, potable water and non-potable water systems. I.e.,
 - i. "Caution Recycled Water" in black or white contrasting lettering on a purple background.
 - ii. "Potable Water" in white lettering on a blue background.
 - iii. "Non-Potable Water" in white lettering on a blue background.Tags shall be identified with the appropriate wording on both sides. Tags identifying recycled water shall have the appropriate wording on one side and symbol on the opposite side.
7. Aquifers shall be protected against contamination by recycled wastewater via deteriorated or inadequately protected waterwell casings by correcting these physical deficiencies. Recycled wastewater shall not be sprayed on well pump installations and appurtenances.

8. An on-site water supervisor having the responsibility for the protection of the potable water system from cross-connections, shall be appointed for the project or location. Title 17, Section 7586 of the California Code of Regulations. The water supervisor will be responsible for the proper installation, operation, and maintenance of the recycled wastewater system. Prevention of potential hazards, implementing these guidelines and coordination with the cross-connection control program of the water purveyor and this Department. Authorizations for piping changes or additions to either the potable or recycled wastewater systems shall be subject to review and approval by the water supervisor. The name and position of this individual shall be reported to the water purveyor and the County of Los Angeles Department of Health Services.
9. As-built plans shall be prepared and updated as necessary by the user showing the location of recycled wastewater and potable water system piping.
10. In areas of public access to recycled wastewater systems, hose bibbs shall not be permitted in order to prevent the unauthorized use of recycled wastewater. Quick-couplers are permissible in lieu of hose bibb outlets and shall only be connected to recycled wastewater lines.
- b. A sign or pressure test must be utilized to confirm the physical separation of the recycled and potable water in areas not accessible to the public, hose bibbs may be permitted provided they are properly identified with the appropriate warning and color coding with the sign "Recycled Water" and "Do Not Drink" in English and symbol.
11. Exposure of drinking fountains and picnic tables to direct recycled wastewater spray shall be minimized by a combination of selective location of such equipment and by appropriate irrigation system design.
- a. Recycled wastewater spraying shall be done in hours of least public exposure.
- b. Areas where recycled wastewater is released, used or impounded shall be posted (e.g., RECYCLED WATER — DO NOT DRINK), to inform the public that recycled water is being used.
- c. Irrigation practice shall be controlled to prevent surface runoff of recycled wastewater from lands owned or controlled by the user.
12. BACKFLOW PROTECTION
 - a. There shall be no interconnection between the Potable Water System and the Recycled Water System within the user's premises.
 - b. A sign or pressure test must be utilized to confirm the physical separation of the recycled and potable water in areas not accessible to the public and performance in conjunction with the Water Purveyor and this Department and conducted before the introduction of recycled wastewater.
 - c. Contact the local water purveyor regarding required backflow protection at the potable water service connection(s) to recycled water use sites.
 - d. In order to maintain the water quality in a recycled wastewater distribution system a backflow prevention device(s) may be required at the recycled wastewater meter or at specific on-site locations where said use could degrade the quality of the recycled wastewater supply.



TYPICAL UTILITY CROSSING DETAIL
NOT TO SCALE

TYPICAL TRENCH DETAIL
NOT TO SCALE



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213-330-7305 60093807-0002

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC HEALTH
APPROVED BY: DATE:

WATER RECLAMATION PROGRAM
ON-SITE DRAWINGS
VAN NUYS HIGH SCHOOL
6535 CEDROS AVENUE
VAN NUYS, CA 91411

RECYCLED WATER RETROFIT SYSTEM
FOR
VAN NUYS HIGH SCHOOL
DETAILS & COUNTY DPH NOTES
SHEET 10 OF 10 SHEETS

APPENDIX C

CAD Guidelines for Recycled Water Projects

CAD Guidelines for Recycled Water Projects

C1. Standard Sheet Sizes and Title Block/Border

All sheet sizes are to be limited to standard formats. Required sheet size is specific to each project and is under the discretion of the Los Angeles Unified School District. The preferred sheet size is D Sized Plot 24" x 36".

They are as follows

- A Sized Plot 8 ½" x 11"
- B Sized Plot 11" x 17"
- C Sized Plot 18" x 24"
- D **Sized Plot 24" x 36" – Preferred Size**
- E Sized Plot 36" x 48"
- E1 Sized Plot 30" x 42"

Matchlines: Matchlines shall be clearly displayed where a portion of the exhibit is to be continued and read as follows: "Matchline A – See Sheet 2"

Sheet Numbering: Sheets shall be numbered as follows in the Standard Title Block: Sheet 1 of 3, Sheet 2 of 3, Sheet 3 of 3. For Standard Title Blocks/Border Sheets see Section C14 of these guidelines.

Border Template shall be provided by the Los Angeles Unified School District and should be used in development and submission of all engineering drawings.

Sheet border, title block, consultant's stamp, logos, and all other components of the master drawing sheet shall be located in "modelspace" and X-referenced into "paperspace" or layout view using 0,0 on the x,y coordinate.

All other graphic representations or entity, notes, dimensions, symbols, etc., shall be constructed in "modelspace".

C2. AutoCAD Project Setup

For sites that include survey information, the World Coordinate System shall correspond to the California Coordinate System NAD 83 for all civil, map and campus plan (including the School Site Master Plans files). Where necessary for compositing drawings on a sheet, a user coordinate system named "PLAN VIEW" shall be established.

Units of measure shall be English units unless otherwise directed.

Drawing units shall be Architectural

C3. External Reference Drawing Use and Setup

The “Base Plan” should be constructed in model space and should be X-referenced into all drawings. The Base Plan should only be modified once to reflect changes on all drawings rather than making changes on multiple sheets of the same Base Plan. The Base Plan should consist of exterior walls that are not to be modified or items that are to remain fixed on a site and will need to appear on multiple sheets.

External Reference drawings shall be created in Model Space and tied to the California Coordinate System NAD 83 as defined within the AutoCAD Project Setup Section.

The External Reference drawing for base information (Base) shall be inserted into the model space of the master drawing. The Standard Title Block shall be inserted into the Layout (Paper) space of the master drawing. Both drawings shall be inserted with an X, Y insertion point of 0,0 and the Universal Coordinate System or “UCS” should be set at “World.” Attach external references to the master drawing using AutoCAD’s External Reference Overlay Function. The insertion point overlay function can be found in AutoCAD’s External Reference Dialog Box.

If the current orientation of the base file in AutoCAD model space is such that rotation is necessary to properly fit all line work onto one sheet or within the standard title block, the rotation shall be completed through the view port in Layout (Paper) Space using the AutoCAD “dview” command.

Titleblock drawings inserted into Layout (Paper) space shall be inserted at a scale of 1:1.

Line type scaling for all drawings that compose the Exhibits will be as follows:

-“LT” scale for all drawings is set at “1”

-“PSLTSCALE” is set to “0”

Line type scaling shall only be adjusted by the layer and/or the line itself in the drawing that it originates in.

Using the “VISRETAIN” command, the visretain variable shall be set to “0” on all referenced drawings.

All External Reference files shall have nothing in layout (paper) space.

External Reference drawings are to be kept in the same folder in which the file that they are being inserted into is located.

The Layout (Paper) space portion of the drawing shall contain a viewport created on the E_VIEWPORT layer in which the “Base” drawing will be brought through. This layer shall be set to the “non-plot” option in the layer manager window. The zoom factors listed below are for scaling the “Base” drawing from model space to paper space.

<u>Paper Space Scale:</u>	<u>Zoom Factor:</u>
1" = 20'-0"	1/240xp
1" = 30'-0"	1/360xp
1" = 40'-0"	1/480xp
1" = 50'-0"	1/600xp
1" = 60'-0"	1/720xp

Paper Space Scale:	Zoom Factor:
1" = 80'-0"	1/960xp
1" = 100'-0"	1/1200xp
1" = 200'-0"	1/2400xp
1" = 300'-0"	1/3600xp
1" = 400'-0"	1/4800xp

C4. File Name and Contents

File naming convention to be used for each drawing shall be as follows:

1. The first letter is the Discipline Designator
2. The first number from 1 thru 11 are the Drawing Designator
3. The last 2 digits are the Page Designator

Example of Sheet Index is shown below for a Recycled Water Irrigation set of drawings:

L – 1.00 and on for Cover sheet and general data (index, general notes, codes, maps, scope, stamps, building summary, legend, abbreviations, etc.)

L – 2.00 and on for site info, site plan and site details (Demo and New)

L – 3.00 and on for retrofit plan (Demo and New)

L – 4.00 and on for retrofit details (Demo and New)

L – 5.00 and on for standard LAUSD-DSA details

L – 6.00 and on for miscellaneous details

L – 7.00 and on for Addendum to General Notes

Discipline Indicator:

A – Architectural drawings

S – Structural drawings

M – Mechanical drawings

P – Plumbing drawings

E – Electrical drawings

FA – Fire Alarm drawings

C – Civil drawings

L – Landscape drawings (including recycled water landscape use)

If a particular discipline does not use a specific drawing, the particular Drawing Indicator shall be skipped to remain consistent with the sheet index pattern. Whenever applicable, the drawing and page indicators should be the same for a design package that contains 2 or more disciplines.

For example, an architectural plan drawing (A – 3.01) used as a background for structural plan drawing (S – 3.01), for mechanical layout drawing (M – 3.01), for plumbing layout drawing (P – 3.01), for electrical plan drawing (E – 3.01) and for fire alarm system layout drawing (FA – 3.01).

Base File: AutoCAD base files shall be set up as listed above in External Reference Drawing Use and Setup.

AutoCAD base files shall consist of but are not limited to the following items: Centerline and Station Points for streets, Curb, Gutter, Sidewalk, Right-of-Way, Lot Lines, Topography, Existing and Proposed Potable and Recycled Water Service Lines.

Base Files shall be named with the tract number followed by “Base”. If the base file is composed of multiple tracts, the first tract number to be listed in the “Tract Number” section of the Standard Title Block shall be used to name the file.

Example: “12345_BASE”

Standard Titleblock File: AutoCAD Standard Titleblock files shall be set up as listed above in External Reference Drawing Use and Setup.

Standard Title Block files shall be named with the tract number followed by “Title Block”. If the Standard Title Block file is composed of multiple tracts, the first tract number to be listed in the “Tract Number” section of the Standard Title Block shall be used to name the file.

Example: “12345_TITLE BLOCK”

Exhibit File: AutoCAD Exhibit file (Model Space Portion) shall be set up in as listed above in External Reference Drawing Use and Setup, and have the “Base File” inserted into it as an External Reference.

AutoCAD Exhibit Files (Model Space Portion) also contains specific elements that vary per exhibit.

Vicinity Map: A vicinity map is shown on each of the Recycled Water Use Exhibits showing the location of the project within the Service Area. The vicinity map shall show cities, freeways, major roads, and landmarks. A north arrow must be located in the bottom half of the map, pointed towards the top of the sheet. The vicinity map shall be on the Cover Sheet.

C5. Line Weights and Pen Numbers

CAD drawing templates have been developed for the various disciplines and should be applied to submittals to the Los Angeles Unified School District when possible. Drawings should be graphically clear and legible. Although best efforts have been made to develop a simple and easy to use template, the design professionals are responsible for the production and appearance of their hard copy submittals.

The following pen assignments are to be used for black and white AutoCAD line work associated with the Plans.

AutoCAD Color	Pen Number	Line Width	%Screen	Output
Red	1	.13	0	Black
Yellow	2	.25	0	Black
Green	3	.35	0	Black
Cyan	4	.50	0	Black
Blue	5	.65	0	Black
Magenta	6	.80	0	Black

AutoCAD Color	Pen Number	Line Width	%Screen	Output
White	7	1.4	0	Black
Lt. Red	11	.13	30%	Halftone
Lt. Yellow	41	.25	30%	Halftone
Lt. Green	71	.35	30%	Halftone
Lt. Cyan	132	.50	30%	Halftone
Lt. Blue	161	.65	30%	Halftone
Lt. Magenta	191	.80	30%	Halftone

Pen assignments shall be adjusted in accordance with the drawing scale that is assigned to each exhibit. The creator of each exhibit shall use their own judgment when adjusting pen assignments, to make the exhibit clear and legible for the end user(s).

C6. Line Types

AutoCAD line types shall be used in the creation of the Recycled Water Use Exhibits as follows:



Project Limit Line
Standard Linetype: DASHED 2
CAD Standard Color: 41



Construction Document Packages
Standard Linetype: PHANTOM
CAD Standard Color: RED



Project Phasing
Standard Linetype: DASHED
CAD Standard Color: RED



Existing Potable Water Service Line
Standard Linetype: DASHED
CAD Standard Color: 153



Existing Recycled Water Service Line
Standard Linetype: DASHED
CAD Standard Color: 203



Proposed Potable Water Service Line
Standard Linetype: CONTINUOUS
CAD Standard Color: 153



Proposed Recycled Water Service line
Standard Linetype: CONTINUOUS
CAD Standard Color: 203

The scale at which each line type listed above is displayed will be determined by the scale at which the exhibit is setup at. The line type scale can be adjusted in AutoCAD's properties manager, under the general section – linetype scale.



C7. Standard Colors and Hatches

Excessive use of hatch patterns should be limited to avoid unnecessarily large files. All design professionals are responsible for keeping files sizes within reasonable limits.

A solid hatch shall be created by only using AutoCAD "solid" hatch pattern, or with the solid command. Using dense hatch patterns to create solid fill shall not be permitted in the drawing set.



Exhibits shall have standard colored hatches to delineate areas where recycled water and potable water are to be applied for irrigation uses. Hatch pattern for these hatches shall be set to “solid” in the AutoCAD Boundary Hatch and Fill Window.

The following AutoCAD standardized colors shall be used as hatches to delineate between areas irrigated with potable water and areas irrigated with recycled water shown on the exhibit:

	153 (Potable)
	203 (Recycled)






Exhibits shall have standard colors assigned to the offsite potable and recycled water lines. These standard colors shall also apply to the standard symbols used to designate the location of proposed potable and recycled water meters.

The following AutoCAD standardized colors shall be used for potable and recycled water service lines (proposed and existing)

	153 (Potable)
	203 (Recycled)

C8. Standard Blocks

The following standard blocks shall be used to identify the approximate proposed location of the potable and recycled water meters on the Exhibit. These meter symbols and designations shall correspond with the information shown on the Exhibit Table.

	Standard Recycled Water Meter Block
	Standard Potable Meter Block
	Standard RP Backflow for Temporary System to System Potable Water Supply Block
	Standard Resilient Gate Valve Block
	Standard Blow Off

C9. Standard Layer Names

All layering names and information within shall coincide with the following guidelines. Only applicable layers are to be used. Blank layers are not to be included in the electronic data deliverables.

Graphic representations of related items shall be located on a single layer even when indicated on different drawings, e.g., full height walls could be properly shown as A-WALL or A-WALLFULL, not both.

Graphic indicators for text and notes, e.g., header line and arrowheads for a note, shall be located on the same layer as the corresponding text.

Major group headings shall define the layer's discipline as follows:

- A=Architectural
- C=Civil
- E=Electrical
- F=Fire Protection
- L=Landscape
- M=Mechanical
- P=Plumbing
- Q=Communications
- S=Structural

The organization of layer names by discipline is merely a convenience to aid in finding the appropriate layer.

For example: A-DOOR is the only acceptable layer for indicating a door in all disciplines. By the same logic E-LITE-EXIT is the only acceptable layer for indicating an exit light in an architectural drawing. These discipline-specific guidelines shall be used whenever possible.

Use the Los Angeles Unified School District templates provided by LAUSD as much as possible. Add layers as necessary, but limit use of unnecessary layers.

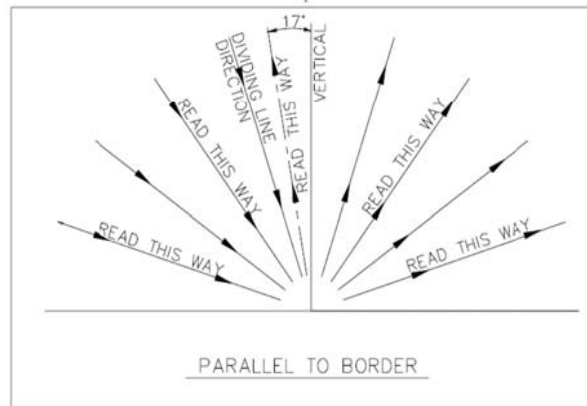
C10. Standard Font and Text Orientation

Recycled Water Use Exhibits shall use a standard AutoCAD font and font style for all labels, call-outs and attributes associated with them, eg, Romans, romand, Ariel, etc.

Font sizes for exhibits shall be adjusted in accordance with the drawing scale that is assigned to each exhibit. The creator of each exhibit shall use their own judgment when adjusting font sizes to make the exhibit clear and legible for the end user(s). Bold and italic typefaces may also be assigned to fonts when necessary.

Minimum font sizes for titleblocks shall be 1/16" for keymap text and 1/8" for all other text used.

Minimum font sizes for text used in all exhibits shall be 1/8" Orient text and lettering normal to the reading plane, or parallel to the line that is referenced. Text orientation standards are shown in the diagram below.



Note: This illustration is provided only to portray how this example should appear. Fonts, line weights, and scale may differ when plotted.

C11. Dimensioning

All dimensions shown in the project submittals shall be fully associative. Dimension definition points should be located with an appropriate Object Snap (End Point, Mid Point, etc.) or otherwise located precisely on the project geometry. Manual input of dimension text or otherwise overriding the actual dimensions is NOT acceptable.

C12. Pen Assignments

Recycled Water Use Exhibit Line Weights, Pen Numbers and Standard Colors are based upon a standard pen assignment AutoCAD ctb file that is provided by LAUSD or a LAUSD appointed consultant. This Pen Assignment file shall be loaded into the Plot Style Table (Pen Assignments) section of the Plot window in AutoCAD.

Adjustments shall be made depending on plotting (printing) device to ensure that hard copies of Recycled Water Use Exhibits are legible and the required information is shown in an appropriate manner.

C13. Submittal Requirements

- All information described in project requirements shall be included in the electronic data deliverables.
- All deliverables are to be provided on Windows Formatted CD-ROMS.
- All files are to be copied directly to the CD-ROMS. No compression or archive utilities are allowed.
- All drawing files shall be saved in AutoCAD version 2006 or above. No other formats or versions will be acceptable without prior written authorization by the Los Angeles Unified School District.

The Design Professional is responsible for archiving the electronic data until final written acceptance from the Los Angeles Unified School District has been issued. Electronic data deliverables are required with all submittals as outlined in the project contract agreements.

C14. Standard Title Block and Sheet Setup A standard title block and sheet setup is used for each drawing. See the figures on the next page.

SCHOOL NAME
ADDRESS LINE #1
ADDRESS LINE #2

**LOS ANGELES UNIFIED
SCHOOL DISTRICT
DESIGN AND A/E
TECHNICAL SUPPORT
FACILITIES SERVICES DIVISION
333 S. BEAUDRY AVENUE, 23RD FLOOR
LOS ANGELES, CALIFORNIA 90017
TEL: (213)241-4254
Fax: (213)241-4199**

PROJECT NAME/TITLE	LOS ANGELES UNIFIED SCHOOL DISTRICT

[illegible]



LOS ANGELES UNIFIED
SCHOOL DISTRICT
DESIGN AND AE
TECHNICAL SUPPORT
FACILITIES SERVICES DIVISION
555 S. MAIN AVENUE, 23RD FLOOR
LOS ANGELES, CALIFORNIA 90071

ABBREVIATIONS AND SYMBOLS

- AT
ADJ. ADJACENT
A.C. ASPHALT CONCRETE
BLDG. BUILDING
B.L.O. BLOW OFF
C&G CURB & GUTTER
C.L.R. CLEAR
CONC. CONCRETE
CONC. CONCRETE
C.V. CHECK VALVE
DIA. (Ø) DIAMETER
DIM. DIMENSION
D.M. DIMENSION
E.A. EACH
EL. ELEVATION
EXIST. EXISTING
F.H. FIRE HYDRANT
F.S. FIRE SERVICE
F.T. FOOT
H.B. HOSE BIBB
IN. INCHES
LIN. LINEAR
L.F. LINEAR FOOT
NO./# NUMBER
P.L.S. PLEASE
P.L. PLANTING AREA
P.W. POTABLE WATER
P.W. POTABLE WATER
R.V. REMOTE CONTROL VALVE
REQD. REQUIRED
R.P. REQUIRED PRESSURE PRINCIPLE
R.W. RECYCLED WATER
R.W. RECYCLED WATER
S.C. SIGHT OF WAY
S.F. SQUARE FOOT
SHEET SHEET
SPEC. SPECIFICATIONS
STD. STANDARD
S.D. STORM DRAIN
TYP. TYPICAL
W.M. WATER METER

LEGEND

- CHMM POTABLE WATER METER
+ WATER METER
+ CHECK VALVE
+ GATE VALVE/CORP. STOP
+ PERMANENT OR COUPLER VALVE
+ IRRIGATION GATE VALVE
+ REMOTE CONTROL VALVE
+ "DO NOT DRINK" SIGN
+ BACKFLOW PREVENTER ASSEMBLY
+ PRESSURE VACUUM BREAKER (PVB)
+ HOSE BIBB
+ DRINKING FOUNTAIN
+ FIRE HYDRANT
+ REVISION CLOUD AND DELTA
+ CONCRETE PAVING
+ EARTH

- RECYCLED WATER IRR. AREA
EXIST. RECYCLED WATER IRR. AREA
DEMOLISH
EXIST. RECYCLED WATER MAIN LINE
NEW RECYCLED WATER LINE
EXIST. POTABLE WATER LINE
EXIST. IRRIGATION MAIN LINE
EXIST. IRRIGATION LINE
PROPERTY LINE
EXIST. FIRE LINE

PROJECT TITLE AND SCHOOL LOCATION
(PROJECT TITLE-LINE 1)
(PROJECT TITLE-LINE 2)
(PROJECT TITLE-LINE 3)
(PROJECT TITLE-LINE 4)
(PROJECT TITLE-LINE 5)
(SCHOOL NAME - LINE 1)
(SCHOOL NAME - LINE 2)
(SCHOOL LOCATION - LINE 3)
(SCHOOL LOCATION - LINE 4)
(SCHOOL LOCATION - LINE 5)
COMMISSIONED ARCHITECT
(ARCHITECT-LINE 1)
(ARCHITECT-LINE 2)
(ADDRESS - LINE 1)
(ADDRESS - LINE 2)
(ADDRESS - LINE 3)
(TEL: # LINE - 4)
(FAX: # LINE - 5)
CONSULTANT
(CONSULTANT-LINE 1)
(CONSULTANT-LINE 2)
(ADDRESS - LINE 1)
(ADDRESS - LINE 2)
(ADDRESS - LINE 3)
(TEL: # LINE - 4)
(FAX: # LINE - 5)
STAMPS/SEALS

DIVISION OF THE STATE ARCHITECT

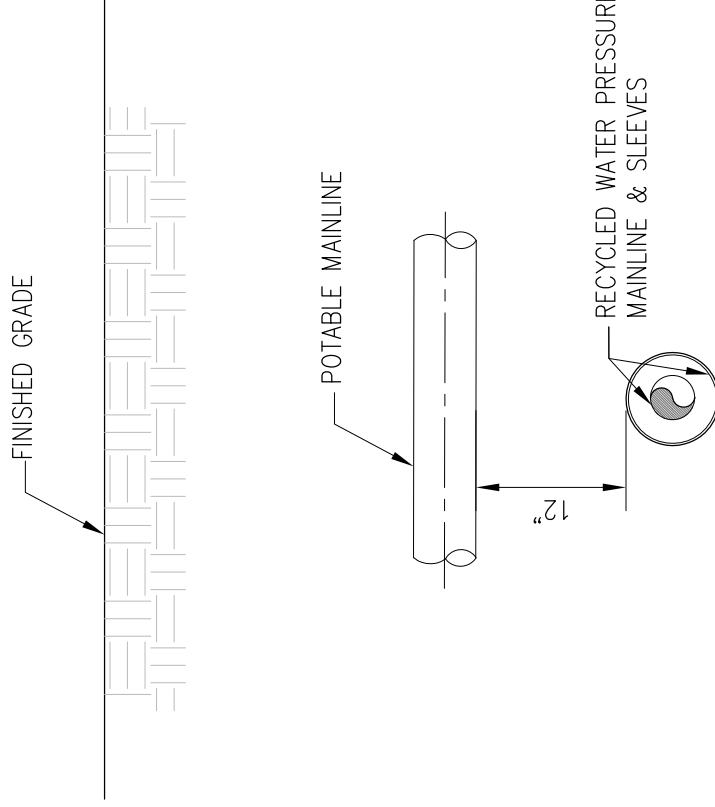
PROJECT NO.
PROJECT NAME
SHEET NO.

PROJECT NO.
PROJECT NAME
SHEET NO.

DRAWING PHASE SCHEDULE									
PROJECT TYPE	DESIGN	PERMIT	CONSTRUCTION	POST-CONSTRUCTION	OPERATION	MAINTENANCE	REPAIR	RENOVATION	DEMOLITION
PROJECT TYPE	DESIGN	PERMIT	CONSTRUCTION	POST-CONSTRUCTION	OPERATION	MAINTENANCE	REPAIR	RENOVATION	DEMOLITION

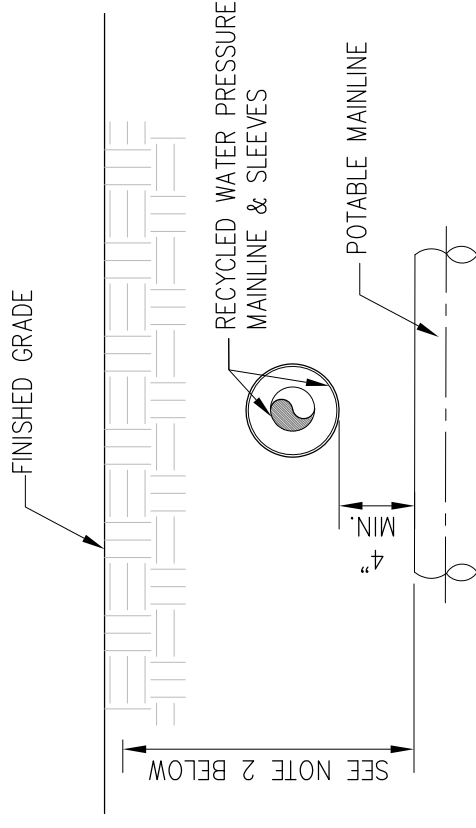
DATE: 01/01/01
PAGE: 01

APPENDIX D
Standard Details



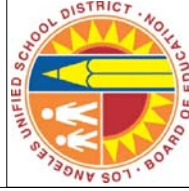
RECYCLED WATER MAIN BELOW POTABLE WATER MAIN

- NOTE:**
- 1) SEPARATION BETWEEN POTABLE AND RECYCLED WATER MAINLINE SHALL MEET THE LATEST REQUIREMENTS OF CDHS GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES.
 - 2) THE MIN. VERTICAL CLEARANCE BETWEEN THE POTABLE AND RECYCLED PIPELINE IS 12".
 - 3) SLEEVING SHALL EXTEND TEN (10) FT EACH SIDE FROM THE CENTERLINE OF THE POTABLE LINE FOR TOTAL LENGTH OF TWENTY (20) FEET. THE SLEEVE SHALL BE PURPLE PVC CL 200 AND 2" LARGER THAN THE DIAMETER OF THE RECYCLED MAINLINE.



RECYCLED WATER MAIN ABOVE POTABLE WATER MAIN

- NOTE:**
- 1) SEPARATION BETWEEN POTABLE AND RECYCLED WATER MAIN LINE SHALL MEET THE LATEST REQUIREMENTS OF CDHS GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES.
 - 2) THE MIN. COVER ABOVE MAINLINE PER LAUSD STD. SPEC. SHALL BE MET AT ALL TIMES.
 - 3) SLEEVING SHALL EXTEND TEN (10) FT EACH SIDE FROM THE CENTERLINE OF THE POTABLE LINE FOR TOTAL LENGTH OF TWENTY (20) FEET. THE SLEEVE SHALL BE PURPLE PVC CL 200 AND 2" LARGER THAN THE DIAMETER OF THE RECYCLED MAINLINE.



LOS ANGELES UNIFIED SCHOOL DISTRICT
FACILITIES SERVICE DIVISION

STANDARD TECHNICAL DRAWINGS

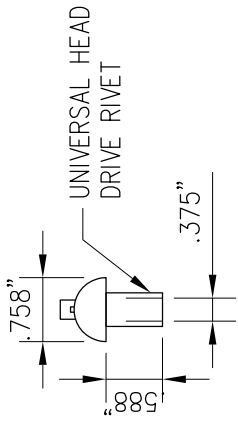
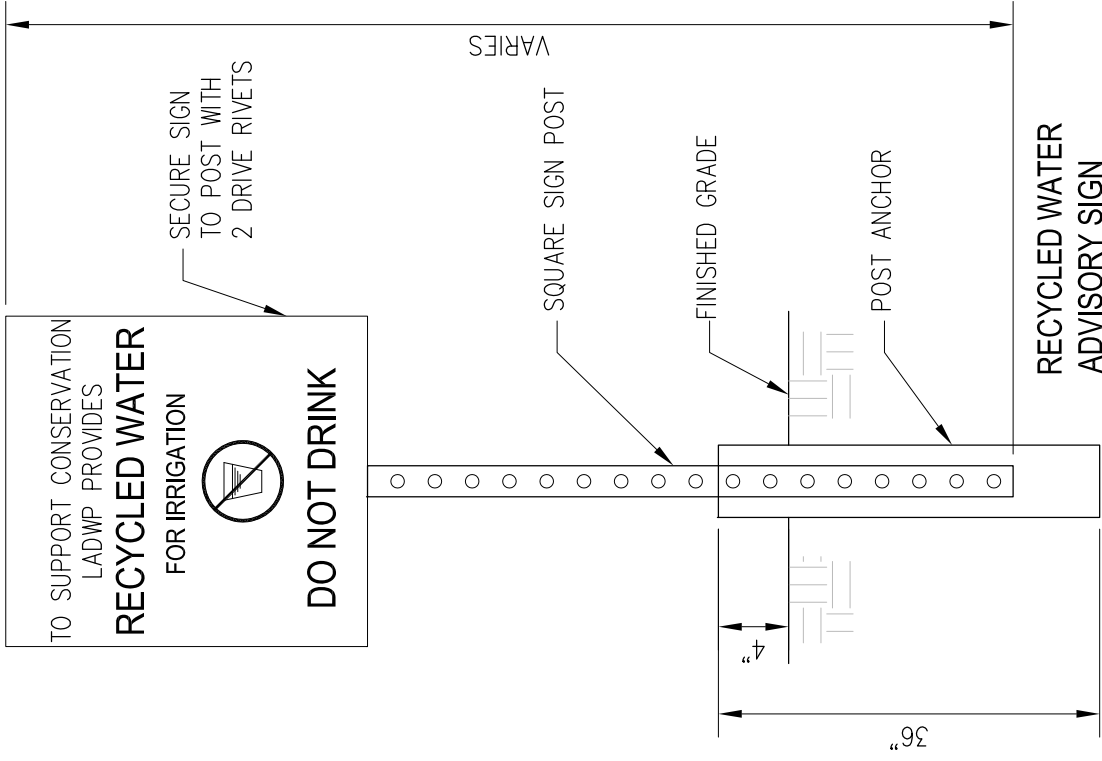
RECYCLED WATER DETAILS

RECYCLED WATER PIPE/POTABLE WATER PIPE CROSSING

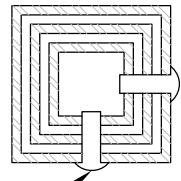
DRAWING NO.

IRR 032

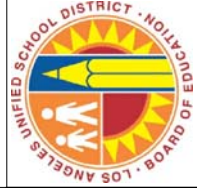
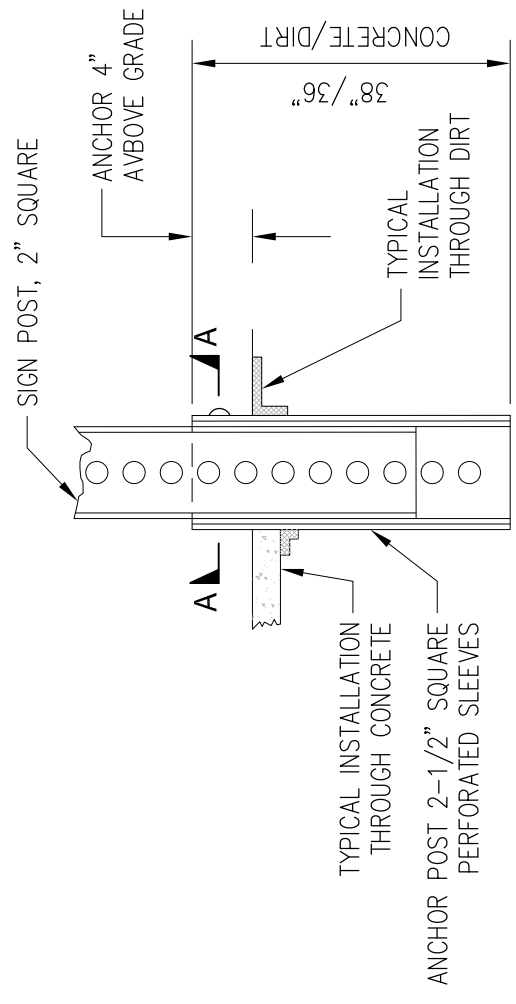
DATE: DEC, 2011



RIVET DETAIL

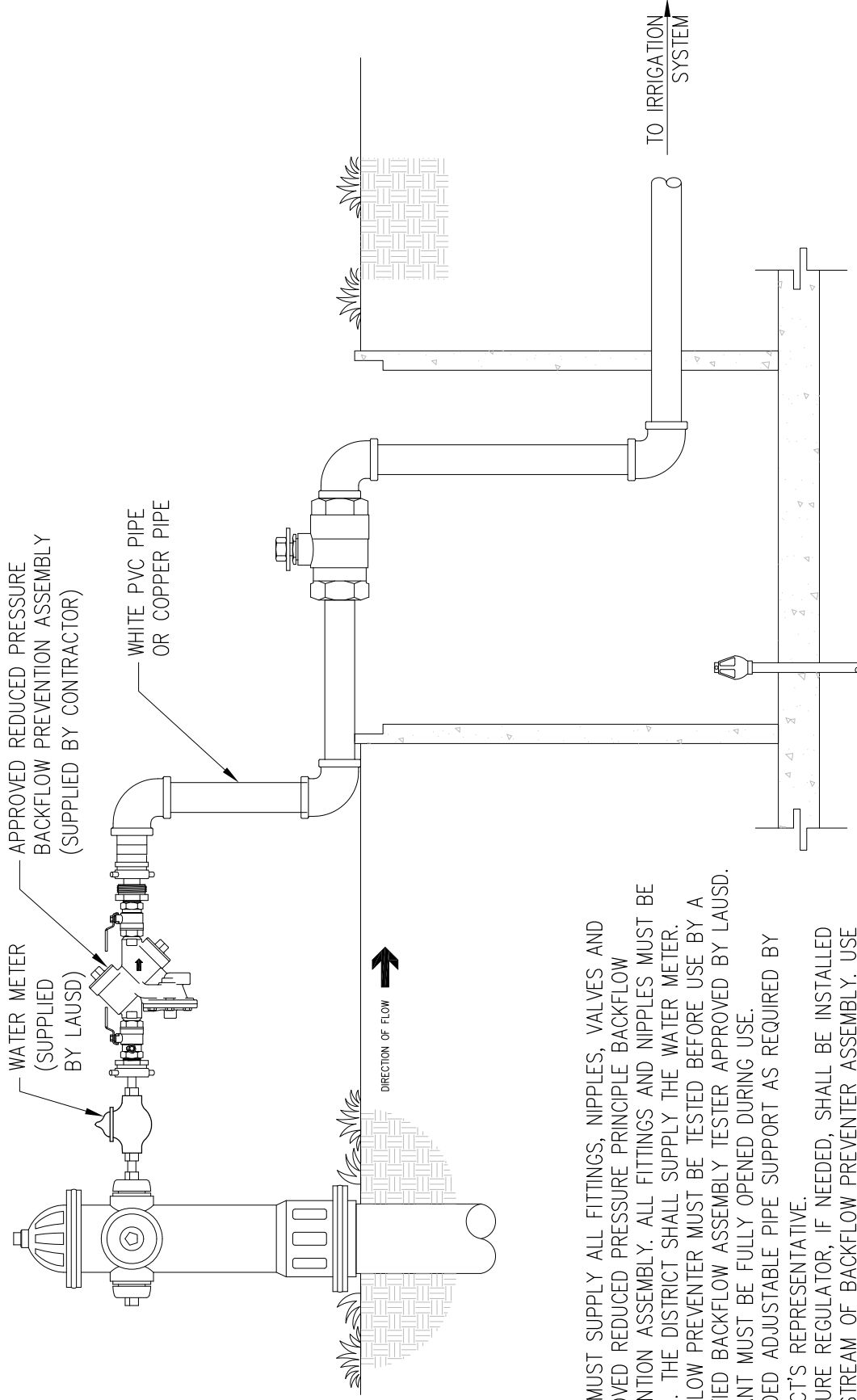


SECTION A-A



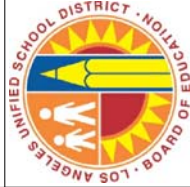
LOS ANGELES UNIFIED SCHOOL DISTRICT
 FACILITIES SERVICE DIVISION
STANDARD TECHNICAL DRAWINGS
 RECYCLED WATER DETAILS
RECYCLED WATER IRRIGATION ADVISORY SIGN

DRAWING NO.
IRR 033
 DATE: DEC, 2010



NOTE:

- 1) USER MUST SUPPLY ALL FITTINGS, NIPPLES, VALVES AND APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY. ALL FITTINGS AND NIPPLES MUST BE BRASS. THE DISTRICT SHALL SUPPLY THE WATER METER.
- 2) BACKFLOW PREVENTER MUST BE TESTED BEFORE USE BY A CERTIFIED BACKFLOW ASSEMBLY TESTER APPROVED BY LAUSD.
- 3) HYDRANT MUST BE FULLY OPENED DURING USE.
- 4) PROVIDED ADJUSTABLE PIPE SUPPORT AS REQUIRED BY DISTRICT'S REPRESENTATIVE.
- 5) PRESSURE REGULATOR, IF NEEDED, SHALL BE INSTALLED DOWNSTREAM OF BACKFLOW PREVENTER ASSEMBLY. USE COPPER PIPE.



LOS ANGELES UNIFIED SCHOOL DISTRICT
FACILITIES SERVICE DIVISION

STANDARD TECHNICAL DRAWINGS

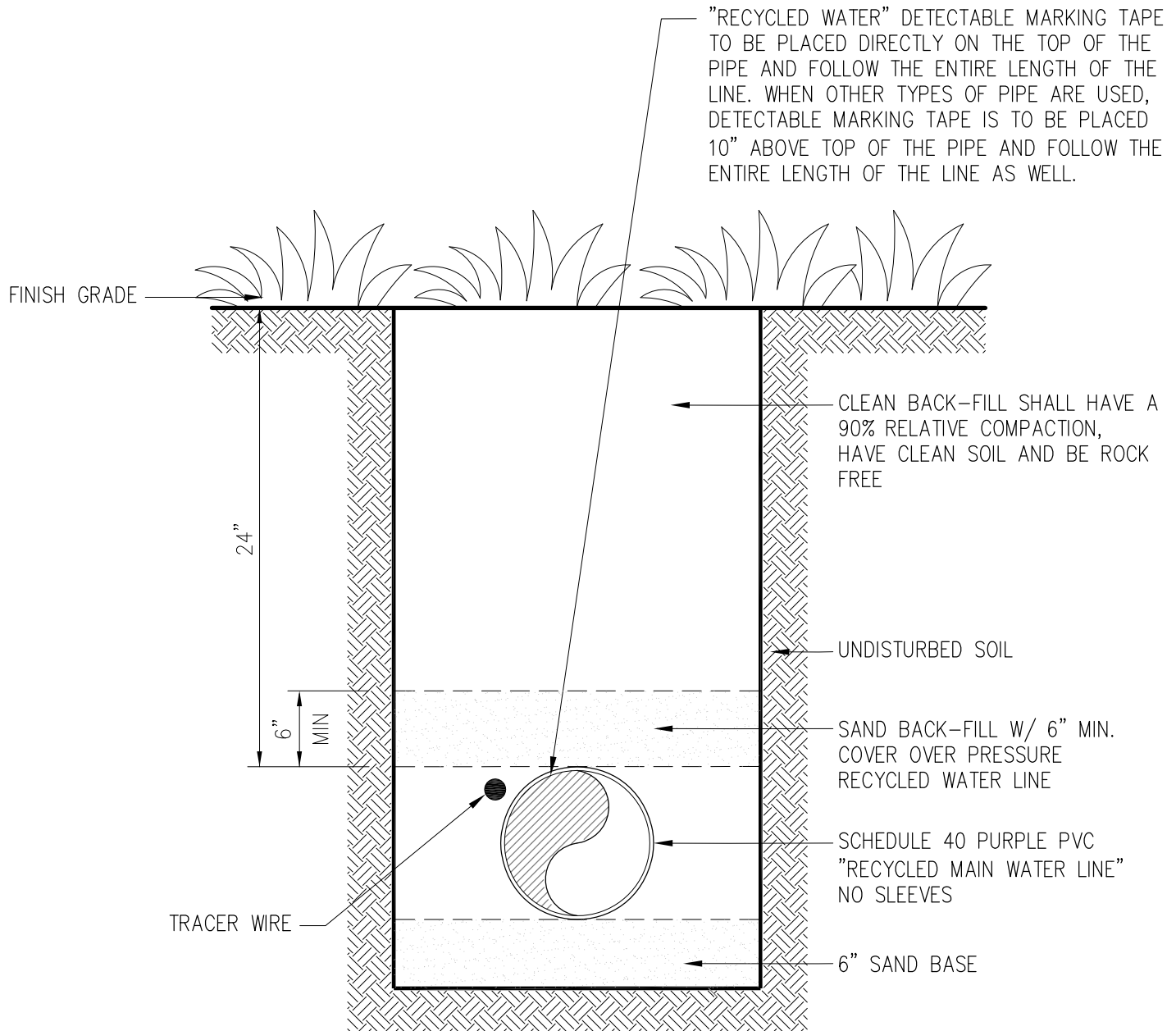
RECYCLED WATER DETAILS

TEMPORARY HI-LINE POTABLE WATER SERVICE CONNECTION (FOR SHUTDOWN TESTING)

DRAWING NO.

IRR 034

DATE: DEC, 2010



SECTION VIEW - N.T.S.



LOS ANGELES UNIFIED SCHOOL DISTRICT
FACILITIES SERVICE DIVISION
STANDARD TECHNICAL DRAWINGS
RECYCLED WATER IRRIGATION DETAILS
TRENCH DETAIL (PLANTED AREAS)

DRAWING NO.

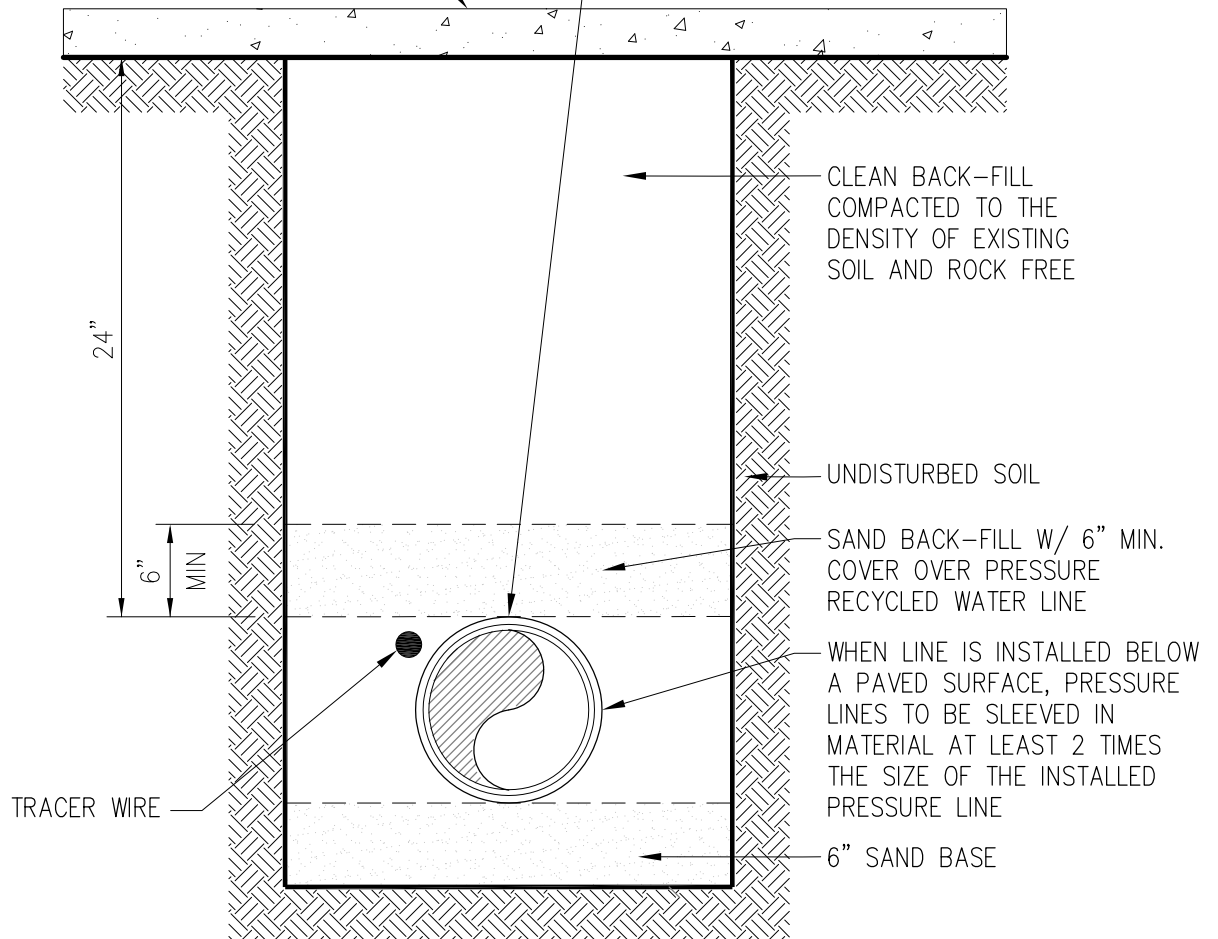
IRR 035

DATE: DEC, 2011

NOTE:
VEHICULAR TRAFFIC CONDITIONS
REQUIRE SLEEVING

SPECIFIC AREAS INCLUDE
CONCRETE WALKWAYS,
SIDEWALKS, DRIVEWAYS, AC
PAVED VEHICULAR TRAFFIC
AREAS, SERVICE ROADS.
SLURRY BACKFILL 1 SACK/BAG

"RECYCLED WATER" DETECTABLE MARKING TAPE
TO BE PLACED DIRECTLY ON THE TOP OF THE
PIPE AND FOLLOW THE ENTIRE LENGTH OF THE
LINE. WHEN OTHER TYPES OF PIPE ARE USED,
DETECTABLE MARKING TAPE IS TO BE PLACED
10" ABOVE TOP OF THE PIPE AND FOLLOW THE
ENTIRE LENGTH OF THE LINE AS WELL



SECTION VIEW - N.T.S.

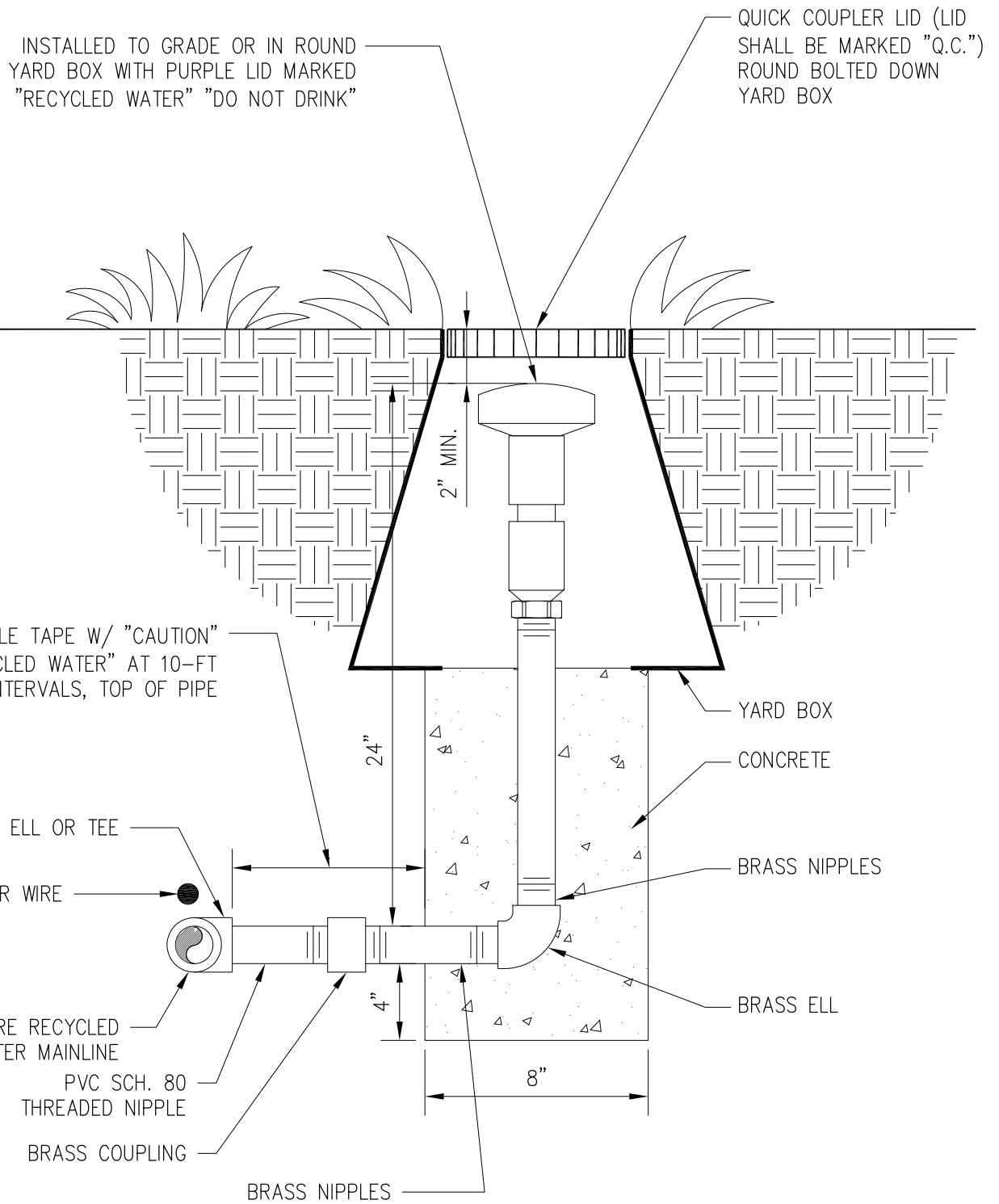


LOS ANGELES UNIFIED SCHOOL DISTRICT
FACILITIES SERVICE DIVISION
STANDARD TECHNICAL DRAWINGS
RECYCLED WATER IRRIGATION DETAILS
TRENCH DETAIL (PAVED & SPECIFIC AREAS)

DRAWING NO.

IRR 036

DATE: DEC, 2011



LOS ANGELES UNIFIED SCHOOL DISTRICT
FACILITIES SERVICE DIVISION
STANDARD TECHNICAL DRAWINGS
RECYCLED WATER IRRIGATION DETAILS
QUICK COUPLER DETAIL

DRAWING NO.

IRR 037

DATE: DEC, 2011

NOTE:

1. DISCONNECTION OF POTABLE WATER SYSTEM IS REQUIRED PRIOR TO CONNECTION OF RECYCLED SYSTEM.
2. MAINTAIN 10-FOOT SEPARATION BETWEEN POTABLE WATER AND RECYCLED WATER FACILITIES AT ALL TIMES.
3. LOCKING TYPE QUICK COUPLER VALVE SHALL BE A NELSON 7645 (ACME THREAD) OR APPROVED EQUAL.
4. RELOCATE FLOW SENSOR AND MASTER VALVE AS NEEDED.

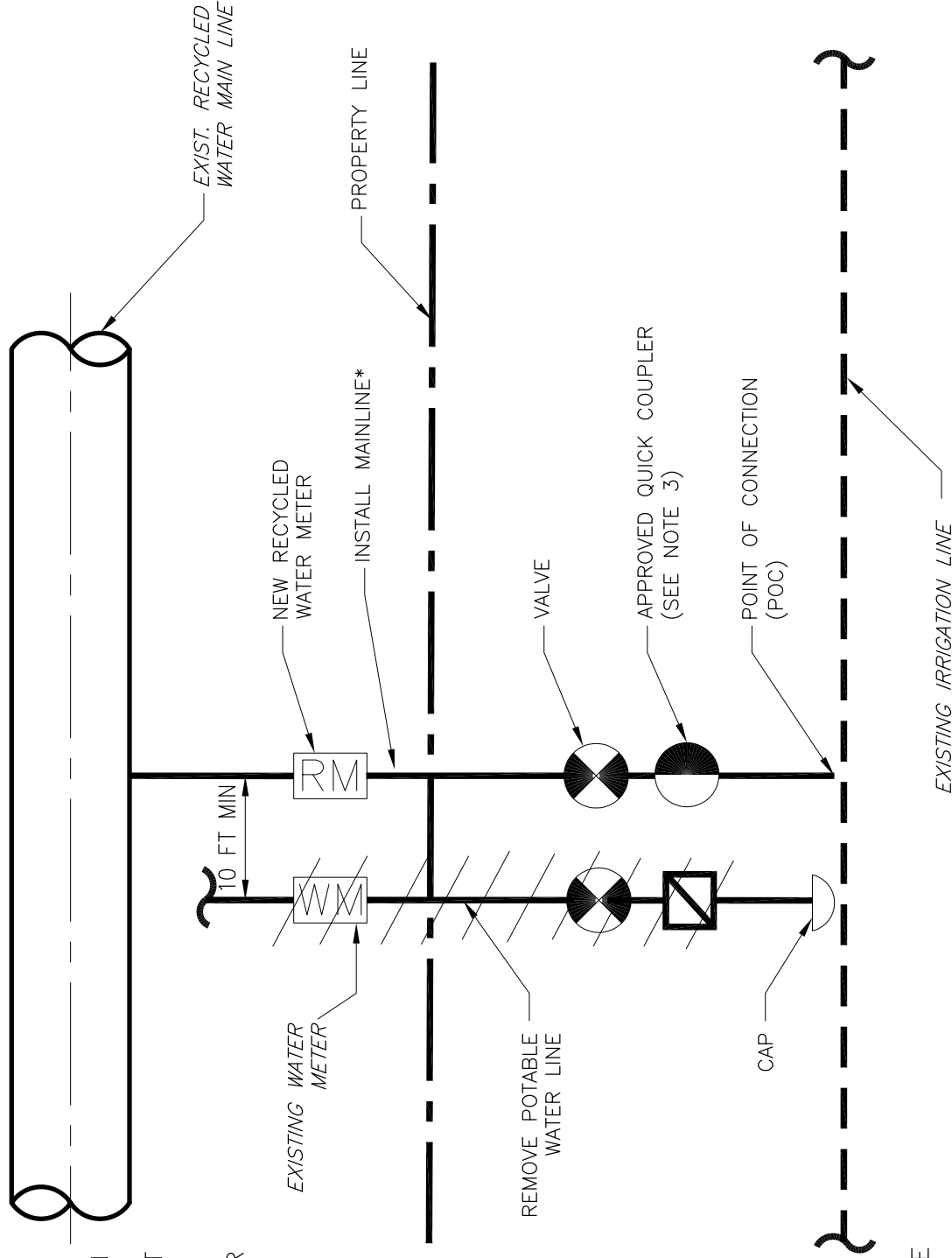
SEQUENCE:

STEP 1. INSTALL RECYCLED WATER MAINLINE BETWEEN METER AND POINT OF CONNECTION (POC).

STEP 2. DISCONNECT AND REMOVE POTABLE WATER LINE AND METER.

STEP 3. CAP POTABLE WATER LINE FROM EXIST IRRIGATION LINE.

* NEW MAINLINE SHALL BE SAME SIZE AS EXISTING MAINLINE (VERIFY DURING CONSTRUCTION)

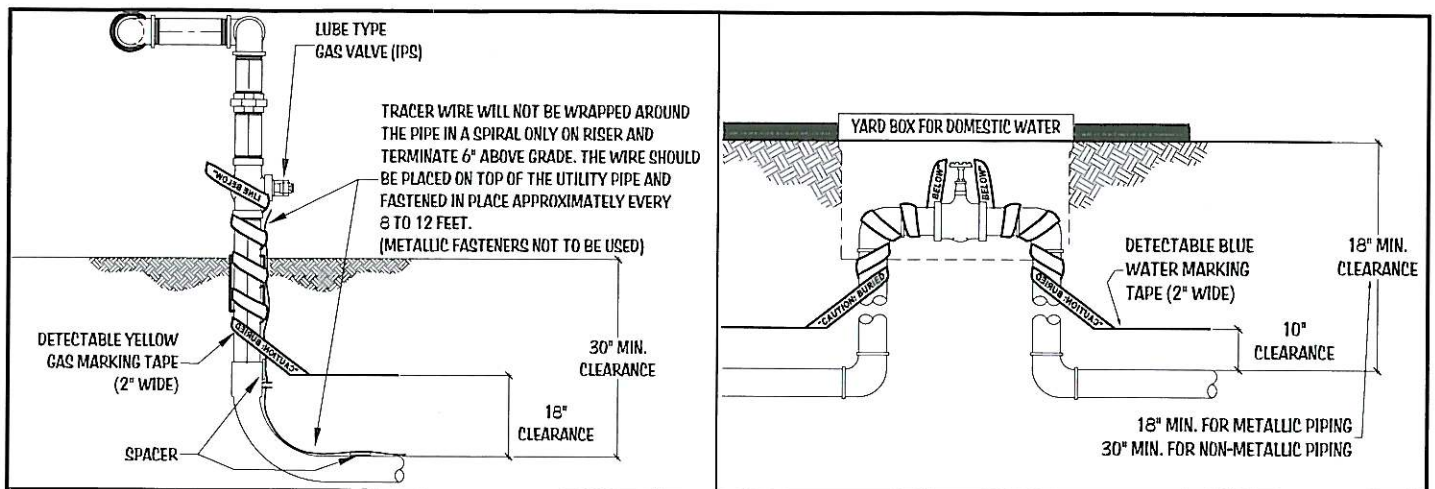


LOS ANGELES UNIFIED SCHOOL DISTRICT
FACILITIES SERVICE DIVISION
STANDARD TECHNICAL DRAWINGS
RECYCLED WATER DETAILS
RECYCLED WATER POC SEQUENCE

DRAWING NO.

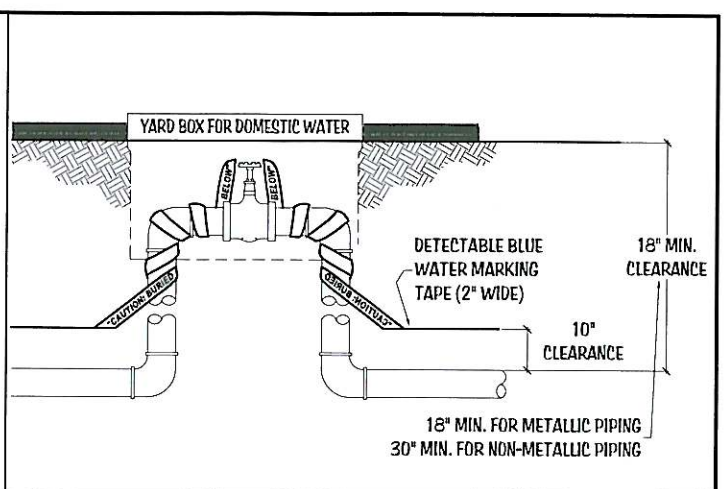
IRR 038

DATE: DEC, 2010



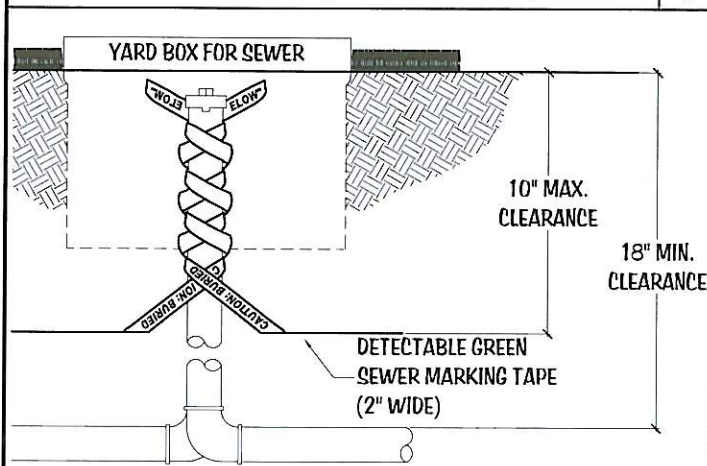
P.E. GAS LINE WITH MARKING TAPE

6



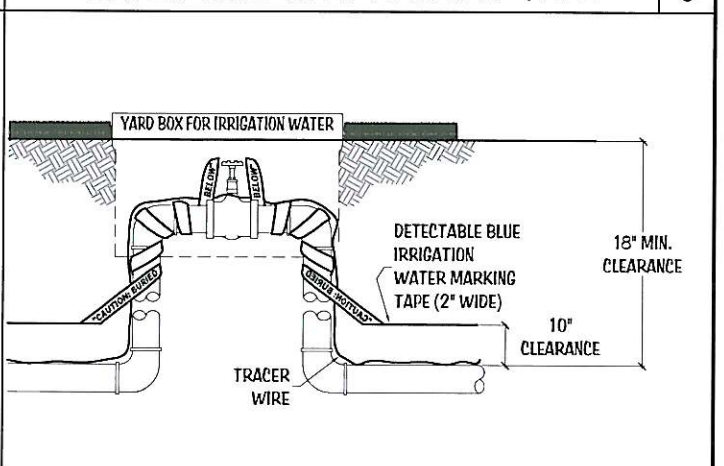
WATER LINE WITH MARKING TAPE

3



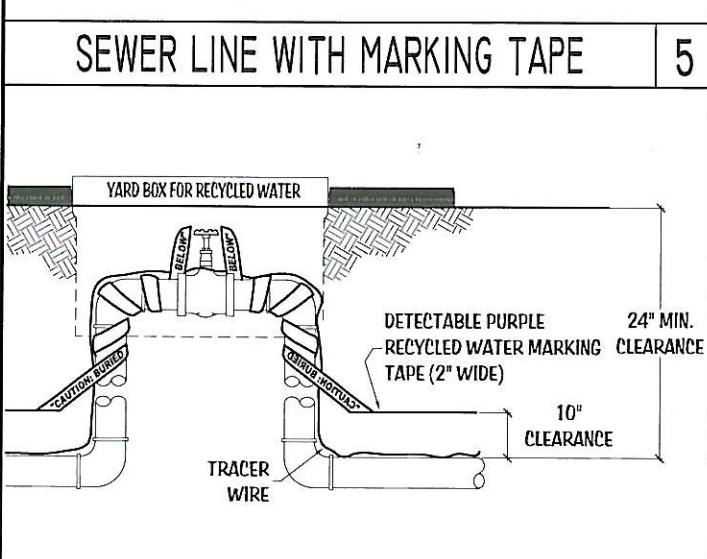
SEWER LINE WITH MARKING TAPE

5



IRRIGATION WTR LINE W/ MARKING TAPE

2



RECYCLED WTR LINE WITH MARKING TAPE

4

NOTE:
ANY NON-METALLIC PIPE SHALL INCLUDE TRACER WIRE IN ADDITION TO THE DETECTABLE MARKING TAPE.

WORDAGE ON EACH TAPE:

BLUE: "CAUTION: BURIED WATER LINE BELOW"

BLUE: "CAUTION: IRRIGATION LINE BURIED BELOW"

GREEN: "CAUTION: BURIED SEWER LINE BELOW"

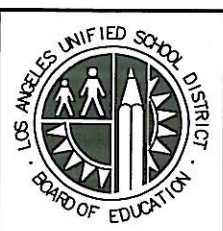
YELLOW: "CAUTION: BURIED GAS LINE BELOW"

PURPLE: "CAUTION: RECYCLED WATER LINE BELOW"

MISC. NOTES

1

THIS DRAWING INDICATES THE DISTRICT'S DESIGN CRITERIA THAT INCLUDE THE SYSTEM DESIGN CONCEPTS, REQUIRED EQUIPMENT, DEVICES, COMPONENTS AND THEIR GRAPHICAL ARRANGEMENT AS REQUIRED BY THE DISTRICT. THE EQUIPMENT, DEVICES AND SYSTEM COMPONENTS INDICATED IN THIS DRAWING SHALL BE PROVIDED IN SIMILAR ARRANGEMENTS TO PERFORM THE SAME FUNCTIONAL INTENT IN THE DESIGN OF EACH SPECIFIC PROJECT. THIS DRAWING IS FOR REFERENCE ONLY AND SHALL NOT BE REPRODUCED IN VERBATIM IN THE CONSTRUCTION DOCUMENTS. DESIGNERS ARE REQUIRED TO PRODUCE PROJECT SPECIFIC DETAILED DRAWINGS THAT INCLUDE THE CRITERIA AND REQUIREMENTS IN THEIR DRAWINGS EXPLICITLY FOR CONTRACTING PURPOSES.



LOS ANGELES UNIFIED SCHOOL DISTRICT
FACILITIES SERVICES DIVISION
STANDARD TECHNICAL DRAWINGS

PLUMBING STANDARD DETAILS

CAUTION BURIED LINE BELOW - DRAFT

DRAWING No.

PLB-20

DATE: NOVEMBER 29, 2010